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CONTRIBUTIONS TOWARD A FLORA OF NEVADA

NO. 43

POLEMONIACEAE OF NEVADA

BY

EDGAR T. WHERRY

IPOMOPSIS AND GILIA SECT. ARACHNION

Contributed by

VERNE GRANT AND ALVA GRANT

August 28, 1957

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Agricultural Research Service

U. S. Department of Agriculture

Plant Industry Station

Beltsville, Md.

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POLEMONIUM NEVADENSE Wherry

POLEMONIACEAE OF NEVADA

By Edgar T. Wherry *

IPOMOPSIS AND GILIA SECT. ARACHNION

Contributed by Verne Grant and Alva Grant **

Contributions Toward a Flora of Nevada, No. 43

Plants dwarf shrubs, herbaceous perennials, biennials or annuals. Flowers perfect, of 5 partly united sepals, 5 partly united petals, 5 stamens with their filament partly adnate to the corolla-tube, and a superior gynoecium of 3 carpels united up to the divergent linear stigmas; these numbers sporadically reduced to 4, 4, 4, and 2 respectively. Fruit a capsule, usually trilocular, dehiscent loculicidally or sporadically by fragmentation.

A moderate-sized family, best developed in the western United States. It is regarded by some taxonomists as comprising less than 10, by others, including the writer, over 20 genera. The plan of subdivision into major groups followed here is based largely on calyx- and leaf-characters; the groups are not allotted technical epithets, pending a revision of the family as a whole.

The descriptions of genera and species herein given apply only to their representatives in Nevada.

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* Professor of Botany, Emeritus, University of Pennsylvania. Field studies of Polemoniaceae in Nevada were supported by grants from the American Philosophical Society in 1940 and from the Board of Graduate Education and Research of the University of Pennsylvania in 1948.

** Rancho Santa Ana Botanic Garden, Claremont, California. Dr. Grant also has kindly contributed considerable locality and other data for the family.

KEY TO MAJOR GROUPS

Calyx-tube remaining unbroken to, or nearly to, maturity; leaves all, or all but the lowest and any connate bracts, alternate.

Leaves pinnate; calyx herbaceous, accrescent. . . . POLEMONIUM GROUP

Leaves lobed or entire; calyx herbaceous to membranous, accrescent or marcescent . . . . . COLLOMIA GROUP

Calyx-tube mostly splitting along intersepaline membranes.

Leaf-position opposite, or becoming alternate upward.

Leaf-blade entire . . . . . PHLOX GROUP

Leaf-blade lobed or dissected on a palmate pattern, in some taxa becoming pinnate or entire upward.

Sepals broad, without costa, thick-margined, joined by obscure membranes . . . . . LINANTHASTRUM GROUP

Sepals moderately broad to narrow, with costa, thin-margined, joined by manifest membranes.

Plants low shrubs; leaf-position and dissection plan tending to change upward . . . . . LEPTODACTYLON GROUP

Plants annual herbs; leaf-position and dissection plan remaining constant upward . . . . . LINANTHUS GROUP

Leaf-position alternate, or sporadically basally opposite; leaves lobed or dissected on a pinnate pattern, or sporadically reduced to a single narrow blade.

Leaf-texture soft; tips not acerose . . . . . GILIA GROUP

Leaf-texture firm; tips more of less acerose . NAVARRETIA GROUP

POLEMONIUM GROUP : KEY TO GENERA

Duration perennial; flowers showy, in compound-cymose clusters borne in axils of small bracts . . . . . 1. POLEMONIUM

Duration annual; flowers inconspicuous, solitary or paired, borne on stems opposite leaves . . . . . 2. POLEMONIELLA

1. POLEMONIUM L.

Plants perennial from a horizontal or ascending rootstock, pubes -

cent with often musky glandular hairs. Leaves alternate, with basally expended petiole and oblong compound blade, either plane and pinnate or with pinnately arranged fascicles of leaflets, rendering the cross-section of the leaf subterete. Inflorescence primarily cymose, the cymules grouped in a panicle. Sepals herbaceous, united 1/3-2/3 their length into a campanulate tube, their blade deltoid to oblong, markedly accrescent. Petals united below into a short- or long-funnelform tube, the blade oblong-ovate to semi-orbicular, expanding to a flattish limb, violet ("blue"), lavender, cream-color, or through albinism white. Stamens zygomorphic, their filament pubescent near the adnate base. Style elongate. Ovules several per locule. Seeds obliquely fusiform, black, in some taxa becoming viscid when moistened. (Name from the Greek word for war, presumably in honor of an ancient philosopher noted for his bellicose tendencies, - an attribute not unknown among modern workers on the family.)

About 40 species, 8 of them known in Nevada, in two cases represented here by local variants.

KEY TO SECTIONS

Sepals united half their length or less; corolla-tube short and broad; leaflets paired or rarely fascicled . . . . . A. POLEMONIUM

Sepals united over half their length; corolla-tube long and narrow; leaflets all fascicled . . . . . B. MELLIOSMA

A. SECTION POLEMONIUM : KEY TO SPECIES

1. Habit strict, the stem simple or terminally branched.

   2. Cauline leaves reduced; leaflets mostly free; panicle thyrsoid. 1. P. OCCIDENTALE

   2. Cauline leaves little-reduced; terminal leaflets confluent-

decurrent; panicle corymbose . . . . . 2. P. FOLIOSISSIMUM

1. Habit spreading, the caudex or stem divergently branched.

3. Leaflets paired, coplanar; panicle corymbose.

4. Maximum leaflet-length over 7 mm.; calyx 5-6 mm. long.

5. Leaves up to 15, leaflets to 3 cm. long . . . (P. COLUMBIANUM)

5. Leaves up to 10, leaflets to 2 cm. long.

6. Terminal leaflets markedly confluent, lower petiolulate; style often exserted . . . . . 3. P. CALIFORNICUM

6. Terminal leaflets slightly confluent, lower sessile; style often included . . . . . 4. P. DELICATUM

4. Maximum leaflet-length under 7 mm.; calyx 4-5 mm. long. 5. P. PULCHERRIMUM

3. Leaflets fascicled, up to 18 mm. long; panicle subthyrsoid. 6. P. NEVADENSE

1. POLEMONIUM OCCIDENTALE Greene var. Brand, Engl.. Pflanzenr. IV. 250: 33, 1907.

Polemonium caeruleum δ ? pterospermum Benth., DC. Prodr. 9: 317, 1845; P. occidentale Greene, Pittonia 2: 75, 1890, invalid since proposed provisionally only and based on two distinct taxa; P. caeruleum ssp. occidentale Davids., Univ. Calif. Publ. Bot. 23: 225, 1950.

Rootstock curving up at tip into a strict stem 20-125 cm. high, glabrous to sparse-pubescent; leaves up to 30 cm. long, the petiole about as long as the blade; leaflets 15-27, all free or the uppermost 3 confluent, oblong-lanceolate to ovate, up to 4 cm. long; cauline leaves rapidly reduced upward; inflorescence a thyrsoid panicle, the axis simple or with few ascending branches; sepals 5-8 mm. long, united 1/2-2/3 their length, the blade oblong-triangular, obtusish, glandular-pubescent; corolla about 20 mm. across, the petal-tip acutish, dark violet or in sporadic albinos white; stamens decumbent, the filaments dense-pubescent

at base and anthers deep yellow; style exserted, violet, the stigmatic tips 1-2 mm. long.

Moist grassland and swamp-thickets, widespread over western North America. Specimens have been seen from Elko, Humboldt, Mineral, Nye, Ormsby, Washoe and White Pine Cos., Nevada.

2. POLEMONIUM FOLIOSISSIMUM Gray, Syn. Fl. N. A. 2(1): 151, 1878.

Polemonium caeruleum var. foliosissimum Gray, Proc. Amer. Acad. Arts Sci. 8: 281, 1870.

Represented here by: ssp. ALBIFLORUM (Eastw.) Brand, Engl. Pflanzenr. IV. 250: 34, 1907.

Polemonium albiflorum Eastw., Bot. Gaz. 37: 437, 1904; P. foliosissimum synonym Davids., Univ. Calif. Publ. Bot. 23: 227, 1950; Including P. decurrens Brand, Rep. Sp. Nov. 17: 316, 1921: P. foliosissimum ssp. decurrens Wherry, Amer. Midl. Nat. 27: 745, 1942, a relatively coarse-leaved variant.

Rootstock sending up multiple stems 50-90 cm. high; herbage pubescent; leaves 7.5-15 cm. long, the petiole around 1/5 as long as the blade, the cauline ones little-reduced; leaflets 11-19, elliptic-oblong, up to 20-40 x 5-15 mm., several terminal pairs confluent-decurrent; inflorescence a corymbose panicle; sepals 6-8 mm. long, united 1/2-3/5 their length, the blade elongate-triangular, acutish, glandular-pubescent; corolla 12-15 mm. across, the petal-tips obtuse, creamy-white stamens and styles often exserted.

The typical subspecies usually has somewhat fewer and smaller leaflets, deep violet or in albinos snow-white corollas, and included sta-

mens and styles; its range lies further east.

Moist thickets on mountain slopes, S Idaho to W Wyoming and N Nevada, in which specimens have been seen from Elko and Humboldt Cos.

The type of Polemonium decurrens Brand was a collection by Heller 9375, Aug. 8, 1908, ridge on N side of Lamoille Canyon, 8950 ft., Elko Co., Nevada. The type sheet, originally in the Berlin Herbarium, has been destroyed, but arithmotypes are widely distributed.

3. POLEMONIUM CALIFORNICUM Eastw., Bot. Gaz. 27: 437, 1904.

Rootstock branched, sending up multiple stems 10-20 cm. high; herbage moderately pubescent; leaves 8-15 or exceptionally 20 cm. long, the petiole rarely over 1/4 as long as blade; leaflets up to 23 per leaf, 10-20 x 4-8 mm., 5 or 7 terminal ones confluent-decurrent, the lowest sometimes petiolulate; inflorescence cymose-paniculate; sepals in midanthesis 5-6 mm. long, united half their length, the blade oblong-triangular, acutish, glandular-pubescent; corolla campanulate-rotate, about 10 mm. across, violet; style usually exserted.

Open woods on mountain slopes, Washington to California and W Nevada, in which specimens have been seen from Washoe Co.

A collection by Heller 10918, July 5, 1913, from divide S of Slide Mt., Washoe Co., Nevada, as distributed to several herbaria, represents typical Polemonium californicum. The specimen which reached the Gray Herbarium is, however, the larger P. columbianum Rydb., which is chiefly of more northern range. As Heller usually saw to it that only one taxon was allotted a given number, there is a possibility that an accident occurred in this case, and unless further collecting establishes its pre-

sence, P. columbianum is preferably not attributed to Nevada.

4. POLEMONIUM DELICATUM Rydb., Bull. Torr. Bot. Club 28: 29, 1901.

Polemonium pulcherrimum ssp. delicatum Brand, Engl. Pflanzenr. IV. 250: 35, 1907.

Features much as in the preceding taxon, but often smaller in many parts; petiole 1/4-1/3 as long as blade; only 3 or exceptionally 5 terminal leaflets confluent-decurrent; style usually included.

Wooded rocky slopes, Idaho to Wyoming, N New Mexico, and NE Nevada, in which specimens have been seen from White Pine Co. This material is somewhat intermediate between typical phases of the two taxa.

5. POLEMONIUM PULCHERRIMUM Hook., Bot. Mag. 57: pl. 2979, 1830.

Rootstock stout, branched, sending up multiple stems 9-18 cm. high; herbage glabrous below, pubescent upward; leaves 4-8 cm. long, the petiole about equalling blade; leaflets 17-23 or exceptionally 27, elliptic to orbicular, obtuse, from 2 x 3 to 5 x 6 or rarely 6 x 7 mm. in size, mostly free and petiolulate, but the uppermost sometimes confluent; inflorescence cymose; sepals 4-5 mm. long, united 1/2-3/5 their length, the blade oblong-triangular, acutish, glandular pubescent; corolla 8-12 mm. across, violet; stamens and style included.

Open rocky slopes from sea-level to high altitudes, Alaska to Wyoming and California. Specimens have been seen from Nye and Washoe Cos., Nevada.

On Mt. Rose, Washoe Co., the plants at lower altitudes are relatively large for the species, but higher up they diminish markedly in stature and leaf-size, at the summit becoming dwarf with minute leaflets though

fairly large flowers. The smallest extreme has been named P. montrosensis Nels., Proc. Biol. Soc. Wash. 18: 174, 1905; this seems preferably regarded as a mere form, in which status it becomes P. pulcherrimum f. montrosense Wherry, Amer. Midl. Nat. 27: 749, 1942. The type was a collection by S. B. Doten 4, July, 1927, preserved in the Rocky Mountain Herbarium.

6. POLEMONIUM NEVADENSE Wherry, Amer. Midl. Nat. 34: 375, 1945. (Frontispiece)

Nevada plant, Wherry, Amer. Midl. Nat. 27: 749, 1942; Polemonium pulcherrimum synonym Davids., Univ. Calif. Publ. Bot. 23: 251, 1950.

Rootstock stout, branched, sending up sparse stems to 10-15 cm. high; herbage fine-pubescent; basal leaves to 12 cm. long, the petiole shorter than blade; cauline leaves much reduced; leaf-blade subterete, the leaflets being irregularly fascicled; leaflets up to about 30 per leaf, elliptic, to 8 x 18 mm., acutish to obtusish; panicle short-thyrsoid; sepals about 6 mm. long, united half their length, the blade elongate-triangular, acuminate, glandular-pubescent; corolla subrotate, to 12 mm. across, lavender; stamens included, subequal, basally sparse-pubescent; style about 7 mm. long, included. These features are markedly unlike those of Polemonium pulcherrimum.

Seemingly endemic in the Santa Rosa range, Humboldt Co., Nevada. The type was a collection by Train 347, July 9, 1937, east cliffs, Hinkey Summit near Martin Guard Station, preserved in the Academy Natural Sciences Philadelphia herbarium. Only one other collection is known: Martineau 107, July 2, 1915, divide at head of McConnell Creek, 8400 ft., a few miles SW of the type locality, in the same mountain range.

B. SECTION MELLIOSMA : KEY TO SPECIES

Calyx 8-12 mm. long; sepal tips acuminate . . . . . 7. P. VISCOSUM

Calyx about 7 mm. long; sepal-tips obtusish . . . . . 8. P. EXIMIUM

7. POLEMONIUM VISCOSUM Nutt., J. Acad. Nat. Sci. Phila. (2)1: 154, 1848.

Stems clustered, 12-35 cm. high, the herbage copiously glandular; leaves mostly basal, up to 15 cm. long, the petiole short and blade subterete with numerous fascicles of tiny leaflets; panicle short-thyrsoid; sepals 8-12 mm. long, united 1/2-2/3 their length, the blade elongate-triangular, acuminate, densely glandular; corolla funnelform, 15-25 mm. long, deep violet or in albinos pure white, the petal blade short; stamens and style about equalling the corolla in length.

Rock slides and alpine situations, Washington to Montana, New Mexico and Nevada, in which specimens have been seen from Elko, Lander, Nye, Pershing and White Pine Cos. These are mostly much reduced, with especially small leaflets and flowers for the species.

Material collected by S. Watson 931, Aug., 1868, East Humboldt Mts., Elko Co., has been distributed to herbaria as P. confertum var. mellitum Gray. In habit and herbage this corresponds to the Nevada form of P. viscosum, and is considered by the writer to represent a mere albino of that.

8. POLEMONIUM EXIMIUM Greene, Pittonia 3: 305, 1898.

Polemonium confertum var. eximium Jeps., Man. Fl. Pl. Calif.: 783, 1925.

Similar to the next-preceding species, but the petiole very short, with a broad herbaceous sheathing base; panicle subcapitate; sepals about 7 mm. long, the blade obtusish; corolla about 13 mm. long; stamens

and style deeply included.

Mountain summits, SE California, and reported from Esmeralda Co., Nevada.

2. POLEMONIELLA Heller

POLEMONIUM subg. POLEMONIASTRUM Peter, Engl. & Prantl Nat. Pflanzenf. 4(3a): 52, 1891; sect. POLEMONIASTRUM Brand, Engl. Pflanzenr. IV. 250: 31 & 45, 1907; POLEMONIUM synonym Davids., Univ. Calif. Publ. Bot. 23: 235, 1950.

Plant a branching viscid-pubescent annual. Leaves alternate, up to 6 cm. long, with a short petiole and oblong pinnate blade. Inflorescence reduced to solitary or paired flowers borne opposite the bases of several upper leaves. Sepals herbaceous, 5-7 mm. long, united half their length, the blade deltoid, spreading and enlarging markedly after anthesis. Petals grayish white, scarcely exceeding the sepals, united 1/3 their length, the tips spreading to a subrotate limb. Stamens shorter than the corolla, the filaments shortly adnate to its tube, basally glabrous or sparse-pilose. Style short, the stigmas level with the anthers, leading to self-pollination. Ovules 2-3 per locule. Seeds ellipsoidal, viscid when wet. (Name diminutive of Polemonium.)

Two species, one North and one South American.

1. POLEMONIELLA MICRANTHA (Benth.) Heller, Muhlenbergia 1: 57, 1904.

Polemonium micranthum Benth., DC. Prodr. 9: 318, 1845.

Leaflets 7-13, elliptic; flowers usually solitary; seeds brown.

Open thickets, barrens and waste ground, invading lawns and gardens, British Columbia to Montana and California. Specimens have been seen

from Ormsby and Washoe Cos., Nevada.

COLLOMIA GROUP : KEY TO GENERA

Intersepaline membranes markedly plicate-carinate, the calyx tending to be top-shaped . . . . . 3. COLLOMIA

Intersepaline membranes flat, the calyx cylindric to subcampanulate.

Cauline leaves present, lobed or entire; bracts solitary. 4. ALLOPHYLLUM

Cauline leaves absent, the foliage consisting of the persistent cotyledons and entire involucral bracts . . . . . 5. GYMNOSTERIS

3. COLLOMIA Nutt.

Plants perennial or annual, viscid-pubescent, at least upward. Lowermost leaves opposite, upper ones alternate; blade entire or lobed. Inflorescence subcapitate and involucrate, or reduced to a series of solitary axillary flowers. Calyx rather obliquely top-shaped, basally scarious, somewhat accrescent, often hyaline-marcescent; sepals tending to be unequal, united half their length or more, distally herbaceous, the junction-membranes conspicuously plicate-carinate. Petals united to a funnelform tube, the blades expanding to a subrotate limb, bronzy, salmon, pink, lavender, or white. Stamens unequal; filaments glabrous. Ovule 1 or 2 per locule; seeds ellipsoidal, brown, often becoming viscid when wet. (Name from Greek for glue, in reference to the seeds.)

Fourteen species, of which 5 are known to occur in Nevada.

KEY TO SPECIES

Duration perennial; many leaves lobed . . . . . 1. C. DEBILIS

Duration annual; leaves entire or only anomalously lobed.

Inflorescence subcapitate and involucrate.

Corolla 3 times as long as calyx; hue salmon . . 2. C. GRANDIFLORA

Corolla 2 times as long as calyx; hue pink. . . . . 3. C. LINEARIS

Inflorescence reduced to axillary flowers; corolla bronze to white.

Sepals 1/2 united, the blade subulate-aristate and plications sub-callous-margined . . . . . 4. C. TINCTORIA

Sepals 2/3 united, the blade deltoid acute and plications callous-margined with a terminal papilla . . . . . 5. C. TENELLA

1. COLLOMIA DEBILIS (S.Wats.) Greene, Pittonia 1: 127, 1887.

Gilia debilis S. Wats., Amer. Nat. 7: 302, 1873; Navarretia debilis Kuntze, Rev. Gen. Pl. 2: 433, 1891.

Plant a low spreading perennial; leaves up to 2 cm. long, obovate, petiolate, many palmately divided into 3 or 5 broad obtusish lobes; inflorescence a compact involucrate cyme; calyx about 10 mm. long, the sepals united half their length, the blade triangular, acute; corolla about 20 mm. long, lavender to whitish; seeds unchanged when wet.

Alpine summits, Washington to Montana, Utah and Nevada, where known at 10,000 ft., 4 mi. SE of Jarbidge, Elko Co. The material from this area comprises both the typical ssp. with exserted and ssp. trifida (Pays.) Wherry, with included stamens.

2. COLLOMIA GRANDIFLORA Dougl. ex Lindl., Edw. Bot. Reg. 14: pl. 1174, 1828.

Gilia grandiflora Gray, Proc. Amer. Acad. Arts Sci. 17: 223, 1882; Navarretia grandiflora Kuntze, Rev. Gen. Pl. 2: 433, 1891.

Plant annual; stem erect or oblique, simple or branched, up to 1 m. high; lower leaves taper-petioled, upper sessile, the blade oblong to linear-lanceolate, up to 8 cm. long; principal inflorescence terminal, but secondary ones often present on short branches, compact-cymose, with

an involucre of ovate acutish basally scarious bracts; sepals united about 3/4 their length, the blade deltoid, obtusish; corolla trumpet-shaped, about 3 times as long as the calyx, salmon to whitish; seeds becoming viscid when wet.

Dry thickets and grasslands on rocky and gravelly slopes at moderate altitudes, British Columbia to Montana, Colorado and California. Specimens have been seen from Douglas, Elko, Eureka, Humboldt, Lander, Lincoln, Lyon, Ormsby, Pershing, Storey and Washoe Cos., Nevada.

3. COLLOMIA LINEARIS Nutt., Gen. N. Amer. Pl. 1: 126, 1818.

Gilia linearis Gray, Proc. Amer. Acad. Arts. Sci. 17: 223, 1882;

Navarretia linearis Kuntze, Rev. Gen. Pl. 2: 432, 1891.

Plant annual; stem erect, simple or branched, to 50 cm. high; lower leaves taper-petioled, upper sessile, linear-elliptic to lanceolate, up to 5 cm. long; inflorescence chiefly terminal, capitate-cymose, subtended by lanceolate acuminate basally scarious bracts; sepals united 3/5 their length, the blade triangular-subulate, acute; corolla narrowly funnelform, about twice as long as the calyx, pink to whitish; seeds markedly viscid when wet.

Grassland and waste places, invading fields and gardens, British Columbia to the St. Lawrence valley, Nebraska and California, and adventive further east. Specimens have been seen from Churchill, Elko, Eureka, Humboldt, Lander, Mineral, Nye, Ormsby, Pershing, Washoe and White Pine Cos. Reduced forms, seemingly transitional to Collomia tinctoria, have been collected in Elko, Pershing and Washoe Cos., Nevada; it was the existence of these which led Gray to deny the specific distinctness of the latter.

4. COLLOMIA TINCTORIA Kell. , Proc. Calif. Acad. Sci. 3: 17, 1863. Gilia tinctoria Kell. ex Curr., Bull. Calif. Acad. Sci. 1: 142, 1885; G. aristella Gray, Syn. Fl. N. Amer., ed. 2, Suppl.: 408, 1886; Navarretia aristella Kuntze, Rev. Gen. Pl. 2: 433, 1891; Collomia aristella Rydb., Mem. N. Y. Bot. Gard. 1: 318, 1900. Including Collomia linearis var. subulata Gray, Proc. Amer. Acad. Arts Sci. 8: 259, 1870; Gilia linearis var. subulata Gray, Syn. Fl. N. Amer., ed. 2, Suppl.: 408, 1886; Collomia tinctoria var. subulata Brand, Engl. Pflanzenr. IV. 250: 52, 1907.

Plant annual; stem simple or branched from base, up to 20 cm. high; lower leaves linear to oblanceolate, upper lanceolate, up to 4 cm. long; inflorescence reduced to small cymes or solitary flowers in axils of upper leaves; sepals united half their length, the junction-plications terminally subcallous, the blade subulate-aristate; corolla 8-12 mm. long, bronzy to yellowish white; seeds viscid when wet.

Dry sandy land, Washington to Montana, Utah and California. Specimens have been seen from Elko, Humboldt and Washoe Cos., Nevada.

The material referred to by Gray as the reason for treating the present taxon as a variety of Collomia linearis was presumably a collection by S. Watson 899, July, 1868, East Humboldt Mts., Elko Co., now in the U. S. National Herbarium.

5. COLLOMIA TENELLA Gray, Proc. Amer. Acad. Arts Sci. 8: 259, 1870. Gilia leptotes Gray, Proc. Amer. Acad. Arts Sci. 17: 223, 1882; Navarretia leptotes Kuntze, Rev. Gen. Pl. 2: 433, 1891; Gilia tenella Nels. & Macbr., Bot. Gaz. 61: 34, 1916, non Benth. 1849.

Habit much as in the preceding taxon, but even more reduced; sepals united 2/3 their length, the junction-plications terminally callous, often with a medial papilla, the blade deltoid, acute or somewhat acuminate; corolla 5-8 mm. long, bronzy to white; seeds viscid when wet.

Dry rocky slopes, Washington to Wyoming, Utah, and Nevada, in which specimens have been seen from Douglas, Elko, Lander, Nye, Washoe and White Pine Cos. When naming this taxon Gray gave the type locality (Parley's Park) as in Nevada by mistake for Utah.

4. ALLOPHYLLUM (Nutt.) A. & V. Grant

GILIA sect. ALLOPHYLLUM Nutt., J. Acad. Nat. Sci. Phila., Ser. 2, 1: 155, 1848. COLLOMIA sect. GILIOIDES Benth., DC. Prodr. 9: 308, 1845. GILIA sect. PHLOGASTRUM in part, Brand, Engl. Pflanzenr. IV.250: 88, 1907. GILIA subg. GREENEIANTHUS Mason & A. Grant, Madroño 9: 206, 1948.

Plants annual, 10-50 cm. high, pubescent at least above with often musky glandular hairs. Leaves alternate, petiolate or the upper sessile; the lower pinnately dissected to entire, the upper pinnately or pedately 3- to 5-lobed, irregularly incised, or entire. Inflorescence a small panicle of cymules borne in the axils of leaflike bracts, in ours often reduced to 2 flowers; pedicels short at anthesis, elongating at maturity. Sepals herbaceous with obscure costa, united about half their length by narrow membranes, markedly accrescent, the membranes splitting only tardily. Corolla funnelform, violet to white. Stamens subequal to markedly unequal. Style in ours included. Capsule becoming spherical, with 1, or rarely 2 or 3, black ellipsoidal seeds per locule. (Name from Greek for differing leaves.)

Five species, 2 of them known in Nevada.

In current manuals and floras the members of the present taxon are included in the comprehensive genus Gilia, as a "Gilia gilioides" group. The desirability of placing them in an independent genus, named by raising the status of Nuttall's Section, Allophyllum, was pointed out by A. & V. Grant, El Aliso 3: 98, 1955, and their treatment is here followed, as is their suggestion that it is more closely related to the Collomia group.

KEY TO SPECIES

Stems villous-pubescent; terminal lobes of cauline leaves oblong, 3-15 mm. wide; flowers white to lavender . . . . . 1. A. INTEGRIFOLIUM

Stems puberulent; lobes of most leaves linear-acuminate, 1-3 mm. wide; flowers usually deep-violet . . . . . 2. A. VIOLACEUM

1. ALLOPHYLLUM INTEGRIFOLIUM (Brand) A. & V. Grant, El Aliso 3: 102, 1955.

Gilia gilioides var. integrifolia Brand, Engl. Pflanzenr. IV.250: 93, 1907.

Stem villous-pubescent, branched upward; lower leaves narrowly elliptic, entire or incised, the upper broader, with small unequal basal lobes; calyx 4 mm. long in anthesis, becoming 6 mm. long at maturity; corolla averaging 9 mm. long, white or sometimes lavender.

Open rocky and sandy places at high altitudes, California, chiefly in the Sierras, entering Nevada in Washoe Co.

2. ALLOPHYLLUM VIOLACEUM (Heller) A. & V. Grant, op. cit. p. 106.

Gilia violacea Heller, Muhlenbergia 1: 56, 1904.

Stem puberulent, often branched from base; lower leaves oblong,

pinnately dissected or incised, the upper broader, in part 3-lobed with the middle lobe elongate; calyx 3 mm. long in anthesis, becoming 5 mm. long at maturity; corolla averaging 6 mm. long, mostly deep-violet.

Sandy and gravelly slopes, widespread in California and known in Douglas, Esmeralda, Mineral, Nye, Ormsby and Washoe Cos., Nevada.

5. GYMNOSTERIS Greene

Plants diminutive annuals with persistent connate cotyledons, a leafless stem, and a capitate-cymose inflorescence subtended by an involucre of connate lanceolate to ovate entire basally scarious bracts. Calyx campanulate, uniformly scarious except for short herbaceous sepal tips. Corolla salverform, lavender, bronzy, yellow, or white. Stamens equal, their filaments wholly adnate to the corolla-tube. Seeds several per locule, obliquely prismatic with somewhat winged edges, becoming viscid when wet. (Name from Greek for naked support.)

Two species, both in Nevada.

KEY TO SPECIES

Sepals about 5 mm. long; corolla-tube 7-10 mm. long, well-exserted; limb 7-15 mm. across, bright-hued; stamens and style somewhat exserted.
1. G. NUDICAULIS

Sepals about 4 mm. long; corolla-tube 4-6 mm. long, little-exserted; limb 3-6 mm. across, dull-hued; stamens and style included.
2. G. PARVULA

1. GYMNOSTERIS NUDICAULIS (H. & A.) Greene, Pittonia 3: 304, 1898.

Collomia nudicaulis Hook. & Arn., Bot. Beech. Voy.: 368, 1841; Gilia nudicaulis Gray, Proc. Amer. Acad. Arts Sci. 8: 266, 1870; Navarretia nudicaulis Kuntze, Rev. Gen. Pl. 2: 433, 1891; Linanthus nudicaule Howell, Fl. NW. Amer. 1: 456, 1901.

Height up to 15 cm., but in sterile situations much reduced; corolla showy, the limb bright lilac, lavender, white, cream, or yellow, and throat deep yellow.

Sandy flats, Oregon to Idaho and Nevada, where known in Douglas, Ormsby, Washoe and White Pine Cos. In most colonies here the corolla-hue tends to be lilac or lavender, but yellow-hued forms are found both N and S from Reno in Washoe Co.

An especially large variant has been named GYMNOSTERIS NUDICAULIS f. PULCHELLA (Greene) Wherry, Amer. Midl. Nat. 31: 231, 1944;(Gymnosteris pulchella Greene, Pittonia 3: 304, 1898; G. nudicaulis var. pulchella Brand, Engl. Pflanzenr. IV.250: 151, 1907.) Its type was a collection by C. F. Sonne 439, May 31, 1896, Steamboat Springs, Washoe Co., in Greene Herbarium, Notre Dame.

2. GYMNOSTERIS PARVULA (Rydb.) Heller, Muhlenbergia 1: 3, 1904.
Gilia parvula Rydb., Mem. N. Y. Bot. Gard. 1: 320, 1900; Gymnosteris nudicaulis (as described) Greene, Pittonia 3: 304, 1898; Gilia rydbergi Tidestr., Contr. U. S. Nat. Herb. 25: 437, 1925; Gymnosteris nudicaule var. parvula Jeps., Man. Fl. Pl. Calif.: 809, 1925. Including G. minuscula Jeps., loc. cit., the smallest extreme.

Height up to 8 cm. but in bleak situations reduced to as little as 0.5 cm.; corolla bronzy to white with yellowish throat.

Dry gravelly and sandy slopes, E Oregon to Montana, Colorado and SE California. Specimens have been seen from Elko, Nye and Washoe Cos., Nevada.

PHLOX GROUP : KEY TO GENERA

Duration perennial; calyx not accrescent; corolla showy; adnate filaments copiously pubescent above base; seeds unchanged when wet. 6. PHLOX

Duration annual; calyx accrescent; corolla inconspicuous; adnate filaments sparse-pilose to glabrous above base; seeds becoming viscid when wet . . . . . 7. MICROSTERIS

6. PHLOX L.

Plants low to prostrate shrubs or woody-based perennials. Leaves opposite, sessile, simple and entire. Inflorescence primarily cymose, the cymules in some taxa grouped in panicles, in others single and often reduced to solitary flowers. Sepals partially united to a cylindric tube, the herbaceous blade triangular to subulate, the intersepaline membranes well-defined, split by the maturing capsule. Petals united to a salverform corolla, the blade elliptic to obovate, purple, violet, lilac, lavender, pink, or white. Stamens unequal, the filaments adnate to the corolla-tube nearly throughout their length, with supra-basal tufts of hairs. Styles united below, their free stigmatic tips 0.5-2.5 mm. long, usually shorter than the united part. Ovules 1 or rarely 2 per locule. Seeds ellipsoidal, brown to blackish, unchanged when wet. (Name from a Greek word for flame, in allusion to the brilliant hue of some taxa.)

Sixtyseven species, all but one North American, 18 of them known in Nevada.

KEY TO SECTIONS

Habit upstanding; inflorescence ample.

Style shorter than the stigmas; stamens short . . . . A. PROTOPHLOX

Style longer than the stigmas; stamens elongate . . . . . B. PHLOX

Habit cespitose to pulvinate; inflorescence sparse . . . . C. MICROPHLOX

A. SECTION PROTOPHLOX: A single taxon here

1. PHLOX SPECIOSA ssp. OCCIDENTALIS (Dur.) Wherry, Proc. Acad. Nat. Sci. Phila. 90: 133, 1938.

Phlox divaricata var. occidentalis Dur., J. Acad. Nat. Sci. Phila. (2) 3: 97, 1855; P. occidentalis Dur. ex Torr., Rept. Expl. Surv. RR. Pac. 4: 125, 1857; P. speciosa f. occidentalis Brand, Engl. Pflanzenr. IV.250: 74, 1907; P. speciosa var. occidentalis Peck, Man. Pl. Ore.: 570; Madroño 6: 135, 1941.

Plant a small shrub, the shoots of the season averaging 20 cm. long; leaves thickish, linear to oblong or elliptic-lanceolate, the principal ones 25-65 mm. long and 2-10, most often 4 cm. wide; inflorescence 3- to 18-flowered, the pedicels elongate; sepals 8-13 mm. long, united 1/2-2/3 their length, the intersepaline membranes flat or essentially so, glandular-pubescent; corolla-tube 10-15 mm. long and petal-blade averaging 7 x 10 mm., with a broad terminal notch 1-3 mm. deep, purple to pink; stamens deep-included; styles 1.5-3.5 mm. long, united less than half their length.

Wooded rocky slopes, Washington to California, entering W Washoe Co., Nevada.

B. SECTION PHLOX : KEY TO SPECIES

1. Calyx-membranes flat or obscurely plicate; herbage copiously glandular. . . . . 2. P. VISCIDA

1. Calyx-membranes moderately to strongly plicate-carinate.

2. Corolla-tube under 19 mm. long.

3. Leaf-texture thinnish; outline mostly linear to lanceolate, long-acuminate.

4. Upper herbage glandular-pubescent . . . . . 3. P. VIRIDIS:

5. Lower leaves spaced, moderately broad.

6. Longer leaves averaging 35 and pedicels 20 mm. long. 3a. ssp. COMPACTA

6. Longer leaves averaging 75 and pedicels 35 mm. long. 3b. ssp. LONGIPES

5. Lower leaves crowded, narrow . . . . . 3c. ssp. VIRIDIS

4. Upper herbage eglandular-pubescent to glabrous. 4. P. LONGIFOLIA:

7. Pubescence present.

8. Maximum leaf-length ~~20-40~~ 45-75 mm. . . 4b. ssp. ~~CORTEZANA~~ Longifolia

8. Maximum leaf-length ~~45-75~~ 20-40 mm. 4a. ssp. LONGIFOLIA Cortezana

9. Lower leaves broad-linear, spreading ssp. Cortezana
9. Lower leaves narrow-linear, crowded ssp. Humilis

7. Pubescence obsolete; leaves elongate . . 4d. ssp. CALVA

3. Leaf-texture thickish; outline mostly oblong to ovate, short-acuminate . . . . . 5. P. GRAYI

2. Corolla-tube over 20 mm. long.

9. Tube-length 20-25 mm. . . . . 6. P. STANSBURYI

9. Tube-length 26-33 mm. . . . . 7. P. SUPERBA

2. PHLOX VISCIDA E. Nels., Rev. W. N. Amer. Phlox: 24, 1899.

Phlox stansburyi ssp. compacta var. viscida Brand, Engl. Pflanzenr. IV.250: 67, 1907; P. stansburyi f. Rydb., Fl. Rocky Mts.: 684, 1917.

Plant a woody-based perennial, the shoots of the season 8-15 cm. long; leaves thinnish, linear to narrow-elliptic or lanceolate, all but the lowest glandular-pubescent, the principal ones 25-45 x 2-4 mm.; inflorescence of 3-15 flowers, on pedicels up to 60 mm. long; sepals 10-16 mm. long, united around half their length, the intersepaline membranes

flat; corolla-tube 12-18 mm. long; petal-blade averaging 6 x 10 mm., purple to pink; styles 7-14 mm. long.

Thinly wooded rocky slopes, E Washington and Oregon to New Mexico and Nevada, where known in Pershing and Washoe Cos.

3. PHLOX VIRIDIS E. Nels., Rev. W. N. Amer. Phlox: 24, 1899. (Originally spelled virida; corrected to viridis by Piper, Contr. U. S. Nat. Herb. 11: 458, 1906.) Phlox stansburyi subvar. viridis Brand, Engl. Pflanzenr. IV.250: 67, 1907.

Plant a woody-based perennial, the shoots of the season 5-40, usually around 15 cm. long; leaves linear to lanceolate, mostly long-acuminate; inflorescence of 3-15 flowers, its herbage copiously glandular-pubescent; sepals 9-14 mm. long, united around half their length, the membranes conspicuously plicate-carinate; corolla-tube 11-18 mm. long and petal-blade averaging 6 x 9 mm.; purple to white; style 8-15 or rarely 18 mm. long.

Phlox viridis is divisible into the following three subspecies:

3a. PHLOX VIRIDIS ssp. COMPACTA (Brand) Wherry, Gen. Phlox: 87, 1955. Phlox stansburyi ssp. compacta Brand, Engl. Pflanzenr. IV.250: 67, 1907; P. longifolia ssp. compacta Wherry, Proc. Acad. Nat. Sci. Phila. 90: 135, 1938. Including P. longifolia var. puberula E. Nels., Rev. W. N. Amer. Phlox: 26, 1899; P. stansburyi var. puberula Brand, Engl. Pflanzenr. IV.250: 67, 1907; P. puberula A. Nels., Coult. Man. Bot. C. Rocky Mts.: 397, 1909.

Leaves linear to oblong-lanceolate, mostly well-spaced, the largest 25-45 x 1.5-3.5 mm.; maximum pedicel-length 7-30 mm.

Dry rocky and gravelly slopes, Washington to Wyoming, New Mexico and California. Known nearly throughout Nevada, the county list being: Clark, Elko, Eureka, Humboldt, Lander, Lincoln, Mineral, Nye, Ormsby, Pershing, Washoe and White Pine Cos.

3b. PHLOX VIRIDIS ssp. LONGIPES (Jones) Wherry, Gen. Phlox: 88, 1955. Phlox linearifolia var. longipes Jones, Contr. W. Bot. 12: 53, 1908; P. longifolia ssp. longipes Wherry, Proc. Acad. Nat. Sci. Phila. 90: 135, 1938. Including P. longifolia var. filifolia A. Nels., Bot. Gaz. 54: 143, 1912.

Leaves elongate-linear to narrow-lanceolate, well-spaced, the largest 50-100 x 1-4 mm.; maximum pedicel-length 15-50 mm.

Rocky slopes, Washington to Montana, New Mexico, and Nevada, where known in Clark, Elko, Humboldt, Nye, Pershing and White Pine Cos.

3c. PHLOX VIRIDIS ssp. VIRIDIS

Lower leaves broad-subulate or narrow-linear, numerous and crowded, the upper somewhat wider and more spaced, the largest 2 x 30 mm.; maximum pedicel-length 5-30 mm.; inflorescence and sizes of flower-parts minimal for the species.

Dry gravelly and sandy slopes, Washington to Idaho and central Nevada, in which specimens have been seen from Elko, Humboldt, Lander, Mineral, Nye, Pershing and Washoe Cos.

4. PHLOX LONGIFOLIA Nutt., J. Acad. Nat. Sci. Phila. 7: 41, 1834.

Plant a woody-based perennial or low shrub, the shoots of the season 5-35 cm. long; leaves broad-subulate to narrow-elliptic or lanceo-

late, mostly long-acuminate; inflorescence of 3-18 flowers, its herbage pubescent with glandless hairs or glabrous; sepals 9-15 mm. long, united around half their length, the membranes conspicuously plicate-carinate; corolla-tube 11-19 mm. long; petal-blade averaging 6 x 10 mm., purple, pink, or white; style 9-18 mm. long.

Phlox longifolia is divisible into four subspecies:

4a. PHLOX LONGIFOLIA ssp. LONGIFOLIA

Including Phlox speciosa var. linearifolia Hook., J. Bot. & Kew Misc. 3: 289, 1851; P. linearifolia Gray, Proc. Amer. Acad. Arts. Sci. 8: 255, 1870; P. longifolia var. linearifolia Brand, Helios 22: 80, 1905; P. longifolia ssp. linearifolia Brand, Engl. Pflanzenr. IV.250: 65, 1907. Also P. longifolia ssp. marginata Brand, loc. cit.; P. marginata A. Nels., Amer. J. Bot. 18: 441-442, 1931.

Largest leaves 45-90 x 1.5-3 mm., mostly well-spaced; inflorescence herbage copiously to sparsely pilose; maximum pedicel-length 15-40 mm.

Plains, canyons and mountainsides, often protected by bushes, Washington to Montana, New Mexico, and N Nevada, where known in Elko and Humboldt Cos.

4b. PHLOX LONGIFOLIA ssp. CORTEZANA (A. Nels.) Wherry, Not. Nat. Acad. Nat. Sci. Phila. 87: 5, 1941.

Phlox cortezana A. Nels., Amer. J. Bot. 18: 434, 1931. Including P. cernua E. Nels., Rev. W. N. Amer. Phlox: 22, 1899.

Largest leaves 25-40 x 2-3 mm.; inflorescence herbage copiously pubescent; maximum pedicel-length 10-30 mm.

Rocky slopes and flats, Washington to Montana, New Mexico and N Nevada, where known in Elko, Eureka, Humboldt, Lander and Washoe Cos.

4c. PHLOX LONGIFOLIA ssp. HUMILIS (Dougl. ex Hook.) Wherry, Proc. Acad. Nat. Sci. Phila. 90: 135, 1938.

Phlox humilis Dougl. ex Hook. ; P. speciosa β Hook., Fl. Bor.-Amer. 2: 72, 1838; P. longifolia var. humilis Brand, Engl. Pflanzenr. IV.250: 66, 1907. Including P. pinifolia Brand, loc. cit.: 80, 1907.

Largest leaves 25-40 x 1-2 mm. , the lower ones crowded; inflorescence herbage copiously pilose.

Dry sandy slopes and flats, British Columbia to Montana and N Nevada where known in Elko and Humboldt Cos.

4d. PHLOX LONGIFOLIA ssp. CALVA Wherry, Proc. Acad. Nat. Sci. Phila. 90: 136, 1938.

Phlox longifolia sensu St. John, Torreya 36; 94, 1936, non Nuttall; P. longifolia var. calva Peck, Man. Pl. Ore.: 571; Madroño 6: 135, 1941.

Largest leaves 30-90 x 1-5 mm., all usually well-spaced; herbage glabrous throughout.

Rocky and gravelly slopes, sometimes in thickets, British Columbia to W Wyoming, Utah and N Nevada, where known in Elko, Washoe and White Pine Cos.

5. PHLOX GRAYI Woot. & Standl., Contr. U. S. Nat. Herb. 16: 161, 1913.

Phlox longifolia var. stansburyi f. brevifolia Gray, Proc. Amer. Acad.

Arts Sci. 8: 255, 1870; subvar. brevifolia Gray ex Wats., Bot. U. S. Geol. Expl. 40° 5: 261, 1871; P. longifolia var. brevifolia Gray, Syn. Fl. N. Amer. 2(1): 133, 1878; P. stansburyi var. brevifolia E. Nels., Rev. W. N. Amer. Phlox: 27, 1899.

Plant a woody-based perennial 8-20 cm. high; leaves thickish, linear to oblong-ovate, the largest 12-30 (rarely 35) x 2-8 mm.; inflorescence herbage copiously glandular-pubescent; sepals 9-13 mm. long, united somewhat over half their length, the membranes moderately plicate; corolla-tube 13-18 mm. long; style 11-16 mm. long.

Desert canyons and dry mountainsides, E California to Utah and SW New Mexico. Widespread in Nevada, specimens having been seen from Clark, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Mineral, Nye, Ormsby, Pershing, Storey, Washoe and White Pine Cos.

As in the course of nomenclatorial rearrangement this taxon failed to get a type specimen designated, the writer, Genus Phlox: 94, 1955, proposed as lectotype a specimen collected by Anderson in 1865 at Carson City, Ormsby Co., Nevada, which reached the Gray Herbarium and was annotated as "brevifolia" by Gray.

6. PHLOX STANSBURYI (Torr.) Heller, Bull. Torr. Bot. Club 24: 478, 1897. Phlox speciosa var. ? stansburyi Torr., Bot. Mex. Bound. Surv. (2)1: 145, 1858; P. longifolia var. stansburyi Gray, Proc. Amer. Acad. Arts Sci. 8: 255, 1870; P. stansburyi ssp. eu-stansburyi Brand, Engl. Pflanzenr. IV.250: 66, 1907. Including P. longituba Heller, Muhlenbergia 2: 228, 1906 and P. stansburyi subvar. microcalyx Brand, Engl. Pflanzenr. IV.250: 67, 1907.

Plant a woody-based perennial 10-45 cm. high; leaves linear to oblong-lanceolate, the largest 40-80 x 3-6 mm.; inflorescence herbage pubescent with both glandular and glandless hairs; sepals 7-14 mm. long, united about half their length, the membranes moderately plicate; corolla-tube 19-25 mm. long, conspicuously exserted from the calyx; style 15-21 mm. long.

Dry rocky and gravelly slopes, E California to Utah and S New Mexico. Specimens have been seen from Clark, Elko, Esmeralda, Lincoln, Mineral, Nye, Washoe and White Pine Cos., Nevada.

7. PHLOX SUPERBA Brand, Engl. Pflanzenr. IV.250: 67, 1907.

Phlox stansburyi ssp. superba Wherry, Not. Nat. Acad. Nat. Sci. Phila. 113: 4, 1942.

Plant a woody-based perennial 10-30 cm. high; leaves linear to oblong-lanceolate, the largest 20-60 x 2-5 mm.; inflorescence herbage glandular-pubescent; sepals 9-14 mm. long, united about half their length, the membranes plicate; corolla-tube 26-33 mm. long; styles 18-28 mm. long.

Dry brushy hills from E California to W Utah. Specimens have been seen from Esmeralda, Lincoln, Mineral, Nye and White Pine Cos., Nevada.

The type was a collection by Mrs. H. Brown, April 1905, Tonopah, Nye Co., Nevada, preserved in the herbarium of the California Academy of Sciences. A specimen from the Pahranagat Mts., Lincoln Co., was mistakenly cited by Gray under Phlox dolichantha, a California endemic.

C. SECTION MICROPHLOX : KEY TO SPECIES

1. Surface of corolla-tube, like herbage, glandular-pubescent; calyx-membranes gibbous-carinate . . . . . 8. P. GLADIFORMIS

1. Surface of corolla-tube glabrous.

2. Sepals fleshy, their costa obscure; leaves oblong, coarse-ciliate, their midrib obscure . . . . . 9. P. KELSEYI

2. Sepals herbaceous, their costa, and leaf-midrib, manifest.

3. Leaf-cilia well-developed.

4. Leaf-surfaces glabrescent; inflorescence herbage glandular. 10. P. CAESPITOSA:

5. Habit cespitose, height 6-10 cm. and nodes spaced. 10a. ssp. CAESPITOSA

5. Habit pulvinate, height 2-6 cm. and nodes crowded. 10b. ssp. PULVINATA

4. Leaf-surfaces pubescent; margins decidedly thickened.

6. Hairs in part gland-tipped . . . . . 11. P. COVILLEI

6. Hairs all glandless . . . . . 12. P. GRISEOLA:

7. Height 3-6 cm. and leaf-length 6-12 mm. 12a. ssp. GRISEOLA

7. Height 2-3 cm. and leaf-length 3-6 mm. 12b. ssp. TUMULOSA

3. Leaf-cilia poorly developed or obsolete.

8. Sepal-costa markedly elevated and membranes broad. 13. P. MULTIFLORA

8. Sepal-costa not markedly elevated nor membranes broad.

9. Calyx-membranes bearing a well-marked carina; leaves firm and acerose 14. P. AUSTROMONTANA:

10. Nodes moderately spaced; maximum leaf-length 12-20 mm. . . . . 14a. ssp. AUSTROMONTANA

10. Nodes crowded; maximum leaf-length 8-12 mm. 14b. ssp. DENSA

9. Calyx-membranes obscurely carinate to flat.

11. Habit open-cespitose; leaves often over 12 mm. long. 15. P. DIFFUSA:

12. Membranes subcarinate . . 15a. ssp. SUBCARINATA

12. Membranes flat.

13. Leaf-outline linear-subulate, maximum width 1-2 mm. . . . . 15b. ssp. DIFFUSA

13. Leaf-outline narrow-subulate, maximum width ~~0.5-1~~ 0.75-1.25 mm. . . . 15c. ssp. SCLERANTHIFOLIA

11. Habit cespitose to pulvinate; leaves under 12 mm. long.

14. Internodes pilose to glabrescent. 16. P. HOODII:

15. Maximum leaf-length 6-12 mm.

16. Corolla-tube 8-12 mm. long, manifestly exserted . . . . . 16a. ssp. CANESCENS

16. Corolla-tube 5-8 mm. long, little if at all exserted . . . . . (ssp. HOODII)

15. Maximum leaf-length 4-6 mm. 16b. ssp. MUSCOIDES

14. Internodes tomentose.

17. Shoots terete, the leaves somewhat spaced. 17. P. LANATA

17. Shoots quadrate, the leaves imbricate. 18. P. BRYOIDES

8. PHLOX GLADIFORMIS (Jones) E. Nels., Rev. W. N. Amer. Phlox: 21, 1899.

Phlox longifolia var. gladiformis Jones, Proc. Calif. Acad. Sci. (2) 5: 711, 1895. Including P. gooddingii Nels. & Kenn., Muhlenbergia 3: 141, 1908 and P. caesia Eastw., Leafl. W. Bot. 2: 54, 1937.

Plant a shrublet 6-15 cm. high, the herbage copiously glandular, emitting a musky odor; leaves lanceolate, firm and sharp-tipped, their

maximum size 12-25 x 1.5-3 mm.; inflorescence a few-flowered cyme; sepals 6.5-8.5 mm. long, united about half their length; membranes conspicuously gibboue-carinate; corolla-tube 8-15 mm. long, unusual in being glandular-pubescent; petal-blade averaging 7 mm. long, lilac to white with bluish sheen; style 2.5-5 mm. long.

Dry rocky slopes, endemic in SW Utah and adjacent Lincoln Co., Nevada. Material from Mormon Mts. in this county was the basis of the epithet Phlox gooddingii, the type being a collection by Kennedy & Goodding 103, July, 1906, preserved in the Nevada Agricultural Experiment Station herbarium. As this differs from the type of the species only in having pedicels up to 5 instead of 2 mm. long, it is regarded as a mere form.

9. PHLOX KELSEYI ssp. SALINA (Jones) Wherry, Not. Nat. Acad. Nat. Sci. Phila. 113: 5, 1941.

Phlox douglasii var. salina Jones, Contr. W. Bot. 13: 3, 1910.

Plant a succulent shrublet 5-10 cm. high; leaves linear-lanceolate, fleshy and becoming wrinkled on drying, sparsely ciliate, their maximum size 12-15 x 1.5-2 mm.; inflorescence 1-3-flowered, its herbage glabrous or sparsely pilose; sepals 7-9 mm. long, united about half their length, their costa obscure and membranes flat; corolla-tube 9-12 mm. long; petal-blade averaging 5x 9 mm., pink to white; style 6-7 mm. long.

Saline marshland which becomes desiccated in summer, in 3 disjunct areas, respectively in SW Montana, central Colorado and White Pine Co., Nevada. The type was a collection by M. E. Jones 9982, May 21, 1906, (8 mi. SE of) Cherry Creek, in the last-named area, preserved in Pomona College herbarium.

10. PHLOX CAESPITOSA Nuttall, J. Acad. Nat. Sci. Phila. 7: 41, 1834.

Plant a cespitose to pulvinate shrublet; leaves linear-subulate to oblong, the largest 5-15 mm. long, coarse-ciliate; inflorescence 1- or rarely 3-flowered, its herbage pubescent with gland-tipped hairs; sepals 5-10 mm. long, united about half their length, the membranes flat; corolla-tube 7-14 mm. long; petal-blade averaging 4 x 6 mm., lavender to white; style 2.5-7.5 mm. long.

Represented here by 2 (or possibly 3) subspecies:

10a. PHLOX CAESPITOSA ssp. CAESPITOSA

Plant cespitose, up to 10 cm. high, with somewhat spaced nodes; leaves linear-subulate, with slightly thickened margin, their maximum size 8-15 x 1-2 mm.; style 5-8 mm. long.

Open mountain slopes at moderate altitudes, Idaho to Montana, Colorado and N Nevada, where known in Elko and Washoe Cos., in the latter seemingly only on the slopes of Mt. Rose.

10b. PHLOX CAESPITOSA ssp. PULVINATA Wherry, Not. Nat. Acad. Nat. Sci. 87: 10, 1941.

Plant pulvinate, under 5 cm. high, with crowded nodes; leaves linear-subulate with somewhat thickened margin, their maximum size 6-12 x 0.75-1.75 mm.; style 2.5-5 mm. long.

Cliffs, rocky slopes and mountain summits at high altitudes, S British Columbia to New Mexico and Nevada, in which specimens have been seen from Elko, Nye, Washoe and White Pine Cos.

(10c. PHLOX CAESPITOSA ssp. PLATYPHYLLA Wherry, Not. Nat. Acad. Nat. Sci. Phila. 87: 9, 1941.

This taxon differs from the preceding in its leaves being wider, up to 2 or even 3 mm., with manifestly thickened margin. Its chief range is from Oregon to Montana and Utah, but a sheet in the Gray Herbarium labelled as collected by Anderson at Carson City, Ormsby Co., Nevada bears along with other taxa a small specimen of the present one. The authenticity of this record needs confirmation.)

11. PHLOX COVILLEI E. Nels., Rev. W. N. Amer. Phlox: 15, 1899. Phlox caespitosa ssp. muscoides var. covillei Brand, Engl. Pflanzenr. IV.250: 84, 1907; P. douglasii var. covillei Jeps., Fl. Calif. (3) 2: 140, 1943. Including P. dejecta Nels. & Kenn., Proc. Biol. Soc. Wash. 19: 37, 1906; P. covillei f. dejecta Wherry, Not. Nat. Acad. Nat. Sci. Phila. 113: 7, 1942.

Plant a mound 2.5-5 or rarely 7.5 cm. high; leaves crowded, narrowly elliptic, concave, pilose, the margin markedly thickened, coarsely ciliate, their maximum size 5-7 x 1-2 mm.; inflorescence 1- or 2-flowered, its herbage densely pubescent with coarse hairs, some of them gland-tipped; sepals 5-7.5 mm. long, united about half their length; corolla-tube 7-10 mm. long; petal-blade averaging 3 x 5 mm., lavender to white; style 1.5-3 mm. long.

Open rocky slopes at moderate to high altitudes, endemic along the border of California and Nevada, where known in Clark, Nye and Washoe Cos. The diminutive form to which the epithet dejecta was applied occurs on Mt. Rose and adjacent mountains; its type was a collection by Kennedy 1159, Aug. 17, 1905, in the Nevada Agricultural Experiment

Station herbarium.

12. PHLOX GRISEOLA Wherry, Not. Nat. Acad. Nat. Sci. Phila. 113: 10, 1941.

Plant a low mound or sheet with strikingly gray-green herbage; leaves small, fine-pilose, with markedly thickened coarse-ciliate margin; inflorescence 1-flowered, its herbage copiously pubescent with coarse glandless hairs; sepals 5-10 mm. long, united somewhat over half their length, the membranes flat; corolla-tube 8-13 mm. long; petal-blade averaging 3.5 x 5 mm., lilac to white; style 2-4 mm. long.

This taxon is divisible into two lesser ones classed as subspecies:

12a. PHLOX GRISEOLA ssp. GRISEOLA

Plant forming clumps 3-6 cm. high, with shoots 2-4 cm. long; leaves broadly subulate, their maximum size 6-12 x 1-2 mm.; calyx and corolla toward the upper size-limit for the species.

Rocky slopes near the junction of Utah, Arizona and Nevada, where known in Lincoln, Nye, and White Pine Cos.

The type was a collection by Train 2622, April 20, 1939, Spring Valley, Lincoln Co., Nevada, in Academy Natural Sciences Philadelphia herbarium.

12b. PHLOX GRISEOLA ssp. TUMULOSA Wherry, Gen. Phlox: 140, 1955.

Phlox tumulosa Wherry, Not. Nat. Acad. Nat. Sci. Phila. 113: 9, 1941.

Plant forming mats 2-3 cm. thick, with shoots 1-2 cm. long, locally veneering large mounds of sand; leaves tending to be oblong and concave, their maximum size 3-6 x 0.75-1.25 mm.; calyx and corolla toward the lower size-limit for the species.

Dry rocky and sandy flats, westernmost Utah and adjacent Nevada, where known in Clark, Lincoln and White Pine Cos.

The type was a collection by Moore & Franklin 131, May 22, 1937, 4 mi. NW of Ely and a like distance NE of Ruth, White Pine Co., Nevada, in Academy Natural Sciences Philadelphia herbarium.

13. PHLOX MULTIFLORA ssp. DEPRESSA (E. Nels.) Wherry, Not. Nat. Acad. Nat. Sci. Phila. 87: 12, 1941.

Phlox multiflora var. depressa E. Nels., Rev. Nev. W. N. Amer. Phlox 20, 1899; P. depressa Rydb., Bull. Torr. Bot. Club 33: 148, 1906. Including P. costata Rydb., Mem. N. Y. Bot. Gard. 1: 315, 1900; P. kelseyi var. costata Brand, Engl. Pflanzenr. IV.250: 80, 1907.

Plant a shrublet 4-8 cm. high; leaves linear, glabrous, lax, their maximum size 12-25 x 1.5-2.5 mm.; inflorescence 1-flowered, its herbage glabrescent; sepals 8-13 mm. long, united less than half their length, the costa conspicuously elevated and membranes broad and flat; corolla-tube 8-15 mm. long; petal-blade averaging 5 x 8 mm., white; style 6-9 mm. long.

Open rocky foothills and summits, Montana to New Mexico and to Elko Co., Nevada, where known around Jarbidge.

14. PHLOX AUSTROMONTANA Cov., Contr. U. S. Nat. Herb. 4: 151, 1893.

Phlox douglasii var. austromontana Jeps. & Mason in Jeps. Man. Fl. Pl. Calif.: 786, 1925.

Plant cespitose, grayish green, glabrescent to moderately coarse-pubescent with glandless hairs; leaves linear-subulate, firm and acerose; inflorescence 1-5-flowered; sepals 7-11 mm. long, united over half

their length, the membranes broad and bearing a manifest carina; petal-blade averaging 4-6 mm., pink to white.

Represented here by 2 or possibly 3 subspecies:

14a. PHLOX AUSTROMONTANA ssp. AUSTROMONTANA

Phlox austromontana ssp. vera Wherry, J. Wash. Acad. Sci. 29: 518, 1939. Including P. aciculifolia Kenn., Muhlenbergia 7: 109, 1911.

Height 7.5-15 cm.; maximum leaf-size 12-25 x 1-2 mm.; corolla-tube 8-14 mm. long; style 2.5-5 mm. long.

Rocky slopes, Oregon to Idaho, Colorado and California. Specimens have been seen from Clark, Elko, Esmeralda, Humboldt, Lincoln, Nye, Ormsby and Washoe Cos., Nevada.

The type of Phlox aciculifolia was a collection by Kennedy and Goodding 82, July, 1906, Mormon Mts., Lincoln Co., Nevada, in Nevada Agricultural Experiment Station herbarium. It differs from the type of the species only in being especially compact, so is regarded as a form.

14b. PHLOX AUSTROMONTANA ssp. DENSA (Brand) Wherry, J. Wash. Acad. Sci. 29: 519, 1939.

Phlox densa Brand, Engl. Pflanzenr. IV.250: 83, 1907.

Height 5-10 cm.; maximum leaf-size 10-12 x 1-1.5 mm.; corolla and style as in the next-preceding subspecies.

Dry rocky and gravelly slopes and flats, Oregon to Colorado and Nevada, where common and widespread, specimens having been seen from Clark, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Mineral, Nye, Pershing, Storey and White Pine Cos.

(PHLOX AUSTROMONTANA ssp. PROSTRATA (E. Nels.) Wherry, J. Wash. Acad. Sci. 29: 518, 1939.

Phlox austromontana var. prostrata E. Nels., Rev. W. N. Amer. Phlox: 19, 1899. Including P. acerba A. Nels., Amer. J. Bot. 25: 114, 1938.

Larger than the other subspecies, and developing long-decumbent shoots; height to 20 cm.; maximum leaf-size 15-30 x 1-2 mm.; corolla-tube 12-18 mm. long; style 4-6 mm. long.

Gravelly canyon slopes, SW Utah to SE Arizona and S California. May well occur in S Nevada, but no specimens have been seen.)

15. PHLOX DIFFUSA Benth., Pl. Hartw.: 325, 1849.

Phlox douglasii var. diffusa Gray, Proc. Amer. Acad. Arts Sci. 8: 254, 1870.

Plant a small shrublet; leaves subulate, sparsely ciliate, their maximum size 8-15 x 1-2 mm.; inflorescence 1-3-flowered, its herbage pubescent with glandless hairs; sepals 7-11 mm. long, united about half their length; corolla-tube 9-14 mm. long; petal-blade averaging 5 x 7 mm., lilac or pink to white; style 3-7 mm. long.

Represented here by 3 taxa regarded as subspecies.

15a. PHLOX DIFFUSA ssp. SUBCARINATA Wherry, J. Wash. Acad. Sci. 29: 517, 1939.

Including Phlox cyanea Eastw., Leafl. W. Bot. 2: 175, 1939.

Clumps compact, 5-10 cm. high; sepals united somewhat over half their length, the membranes bearing an obscure carina. An intermediate between Phlox austromontana and the typical subspecies of P. diffusa.

Dry slopes and flats, chiefly at moderate altitudes, Washington to Idaho, New Mexico and California. This is the common representative of the species in Nevada, specimens having been seen from Elko, Humboldt, Mineral, Nye, Ormsby, Pershing, Storey and Washoe Cos.

The type of this subspecies was a collection by Heller 9910a, July 29, 1909, Mt. Rose, Washoe Co., Nevada, in the Academy Natural Sciences Philadelphia herbarium.

15b. PHLOX DIFFUSA ssp. DIFFUSA

Phlox diffusa ssp. typica Wherry, Proc. Acad. Nat. Sci. Phila. 90: 139, 1938.

Clumps open, 10-15 cm. high; sepals united half their length, the membranes flat.

Rocky slopes at moderate to high altitudes, S Oregon to California, known to enter westernmost Washoe Co., Nevada.

15c. PHLOX DIFFUSA ssp. SCLERANTHIFOLIA (Rydb.) Wherry, Not. Nat. Acad. Nat. Sci. Phila. 87: 13, 1941.

Phlox scleranthifolia Rydb., Mem. N. Y. Bot. Gard. 1: 313, 1900; P. douglasii ssp. eudouglasii var. scleranthifolia Brand, Engl. Pflanzenr. IV.250: 85, 1907.

Clumps sprawling, to 10 cm. high and often wider; leaves 8-15 x 0.75-1.25 mm.; sepals united about half their length, the membranes flat.

Dry slopes and flats at moderate altitudes, Washington to SW South Dakota and N California, barely entering Nevada in Elko Co.

16. PHLOX HOODII Richards., Franklin's Narr. Journ. Polar Sea, App.: 733, 1823.

Plant cespitose to pulvinate; leaves broadly subulate, basally arachnoid-tomentose, their maximum size 5-12 x 1-1.5 mm.; inflorescence 1- or rarely 3-flowered, its herbage pubescent with fine kinky hairs; sepals united about half their length, the membranes flat; flowers smaller than in the representatives of taxon No. 15.

This taxon is represented here by 2 or possibly 3 subspecies:

16a. PHLOX HOODII ssp. CANESCENS (Torr. & Gray) Wherry, Proc. Acad. Nat. Sci. Phila. 90: 139, 1938.

Phlox canescens Torr. & Gray, Rept. Expl. Surv. RR. Mo. to Pac. 41°, Bot. 2: 122, 1855; P. douglasii var. canescens Mas., Jeps. Man. Fl. Pl. Calif.: 786, 1925; P. hoodii var. canescens Peck, Man. Pl. Ore.: 572; Madroño 6: 136, 1941. Including P. canescens var. spinosa Brand, Engl. Pflanzenr. IV.250: 84, 1907.

Plant 5-10 cm. high; maximum leaf-size 8-12 x 0.5-1.5 mm.; sepals 6-9 mm. long; corolla-tube 8-12 mm. long, well-exserted; style 3-7 mm. long.

Dry rocky or gravelly slopes at moderate elevations, Washington to Montana, New Mexico and California. Widespread over Nevada, specimens having been seen from Clark, Douglas, Elko, Esmeralda, Humboldt, Lander and Washoe Cos.

16b. PHLOX HOODII ssp. MUSCOIDES (Nutt.) Wherry, Gen. Phlox: 164, 1955.

Phlox muscoides Nutt., J. Acad. Nat. Sci. Phila. 7: 42, 1831; P. caespitosa ssp. muscoides Brand, Engl. Pflanzenr. IV.250: 84, 1907.

Plant 2-4 cm. high; maximum leaf-length 3-5 mm.; sepals 3-6 mm. long; corolla-tube 4-6 mm. and style 2-3.5 mm. long.

Dry gravelly flats, Idaho to Colorado and Utah, extending into N Nevada, in Elko and Washoe Cos.

While the typical subspecies of P. hoodii has been reported in Nevada, no specimens certainly referrable to it have been seen.

17. PHLOX LANATA Piper, Bull. Torr. Bot. Club 29: 643, 1902.

Plant a shrublet 5-10 cm. high with terete shoots, tomentose throughout except for glabrescent leaf-tips; leaves subulate, their maximum size 6-12 x 1 mm.; sepals 6-12 mm. long, united about half their length; corolla-tube little-exserted; petal-blade averaging 3.5 x 5 mm., minutely pubescent above; style 2-7 mm. long.

Rocky mountainsides, Washington to Idaho, Utah, and central Nevada, in which specimens have been seen from Douglas, Elko, Esmeralda, Ormsby, Washoe and White Pine Cos.

18. PHLOX BRYOIDES Nutt., J. Acad. Nat. Sci. Phila. (2) 1: 153, 1848.

Plant a tiny shrublet 2-5 cm. high with quadrate shoots, tomentose throughout except for the glabrescent leaf- and sepal-tips; leaves

narrow-triangular, thickish-margined, the maximum size 3-5 x 1-1.5 mm.; inflorescence of solitary subsessile flowers; sepals 4-7 mm. long, united about half their length, the blade thick-margined and obscurely costate; corolla-tube 4-8 mm. long; petal-blade averaging 2.5 x 4.5 mm., glabrous; style 2-6 mm. long.

Dry rocky, gravelly and clayey slopes, W Montana to central Colorado and E Nevada, in which specimens have been seen from White Pine Co.; also disjunct in central Oregon and N California.

7. MICROSTERIS Greene

Plants small annuals, their height markedly affected by climatic conditions, ranging from 3-30 cm., simple or branched above, variably pubescent. Cotyledons elliptic, persistent. Leaves opposite, the lower mostly elliptic-oblong and upper linear, grading into alternate bracts. Inflorescence cymose, its herbage pubescent with often gland-tipped hairs. Sepals united about half their length to a cylindric tube, accrescent in age, the membranes ultimately splitting. Petals united to a small salverform corolla, the tube often yellow or bronzy, the blade 1-2 mm. long, lilac, pink, or white; stamens unequal, the filaments adnate to the corolla-tube nearly throughout their length, basally glabrous or sparse-pilose. Seeds ellipsoidal, brown, becoming markedly viscid when wet. (Name from Greek for small support.)

Here interpreted as comprising two species, native to both western North America and southern South America.

KEY TO SPECIES

Calyx in anthesis 6–10 and corolla 8–11 mm. long. . . . . 1. M. GRACILIS

Calyx in anthesis 4–6 and corolla 5–8 mm. long. . . . . 2. M. HUMILIS

1. MICROSTERIS GRACILIS (Hook.) Greene, Pittonia 3: 300, 1898.

Collomia gracilis Dougl. ex Hook.; Gilia gracilis Hook., Bot. Mag. 56: pl. 2924, 1829; Phlox gracilis Greene, Pittonia 1: 141, 1887; Navarretia gracilis Kuntze, Rev. Gen. Pl. 2: 433, 1891. Including Microsteris glabella Greene, Pittonia 3: 301 and M. stricta Greene, loc. cit.: 302, 1898.

Plant and flowers relatively large; petal-blade often lilac to pink. In the representative of this taxon occurring here the stem tends to be strict and the herbage glabrescent.

Open thickets, grassy flats and waste-lands, invading gardens and lawns, S British Columbia to Idaho and California; rare in N Nevada, in which a few specimens have been seen from Elko and Washoe Cos.

2. MICROSTERIS HUMILIS (Dougl. ex Hook.) Greene, Pittonia 3: 301, 1898.

Collomia humilis Dougl. ex Hook.; C. gracilis var. humilior Hook., Fl. Bor.-Amer. 2: 76, 1840; Gilia microsteris Piper, Fl. Palouse Reg.: 142, 1901; Phlox gracilis ssp. humilis (Greene) Mason, Abrams Ill. Fl. Pac. St. 3: 413, 1951. Including Collomia micrantha Kell., Proc. Calif. Acad. Sci. 3: 18, 1863; Microsteris micrantha Greene, loc. cit.

Plant and flowers relatively small; petal-blade often pink to white. In the representative of this taxon occurring here the stem tends to be low and branched and the herbage to be glandular-pubescent.

Dry sterile ground and waste-land, British Columbia to Montana,

Colorado and California; common and widespread in Nevada, specimens having been seen from Clark, Douglas, Elko, Humboldt, Lander, Lincoln, Mineral, Nye, Ormsby, Pershing, Storey, Washoe and White Pine Cos.

LINANTHASTRUM GROUP

8. LINANTHASTRUM Ewan, a single genus

SIPHONELLA Nutt. ex Gray; GILIA, part, Gray, Proc. Amer. Acad. Arts Sci. 8: 267, 1870. NAVARRETIA, part, Kuntze, Rev. Gen. Pl. 2: 433, 1891. LINANTHUS, part, Greene ex Milliken, Univ. Calif. Publ. Bot. 2: 54, 1904. LEPTODACTYLON, part, Rydb., Bull. Torr. Bot. Club 33: 149, 1906. Genus LINANTHASTRUM Ewan, J. Wash. Acad. Sci. 32: 139, 1942.

Plants woody-based perennials with clustered stems 8-50 cm. high, the herbage pubescent with glandless hairs to glabrescent. Leaves opposite, 5-25 mm. long, deeply palmately cleft into narrow lobes, their axils often bearing latent shoots. Inflorescence a flat-topped aggregate of small cymes, leafy-bracted. Sepals oblong, lacking a costa but having markedly thickened margins, united by obscure membranes which often early disintegrate. Corolla salverform with stout tube, 8-15 mm. long, white to yellowish. Stamens and style barely exserted. Seeds 1-5 per locule, prismatic with somewhat winged angles, becoming viscid when wet. (Names from Linanthus and star, in reference to the stellate aspect of pairs of multiple-lobed leaves.)

Here interpreted as comprising 3 species, probably all occurring in Nevada.

KEY TO SPECIES

Height 25-50 cm.; herbage glabrescent or rarely pubescent; leaf-lobes 1-3, firm and somewhat acerose, narrowly linear, 12-25 mm. long; flowers sparse, on pedicels up to 20 mm. long; corolla 10-20 mm. long. 1. L. FLORIBUNDUM

Height 8-40 cm.; herbage sparsely to copiously pubescent; leaf-lobes 3-7, herbaceous, narrowly or often broadly linear; pedicels little-developed, rarely up to 5 mm. long.

Habit upstanding to open-cespitose; leaf-lobes 8-25 mm. long; flowers numerous; corolla 8-15 mm. long . . . . . 2. L. NUTTALLII

Habit cespitose to pulvinate; leaf-lobes 5-10 mm. long; flowers sparse; corolla 8-10 mm. long . . . . . 3. L. MELINGII

1. LINANTHASTRUM FLORIBUNDUM (Gray) Wherry, Amer. Midl. Nat. 34: 386, 1945.

Gilia floribunda Gray, Proc. Amer. Acad. Arts Sci. 8: 267, 1870; Navarretia floribunda Kuntze, Rev. Gen. Pl. 2: 433, 1891; Linanthus floribundus Greene ex Milliken, Univ. Calif. Publ. Bot. 2: 55, 1904; Gilia nuttallii var. parviflora subvar. floribunda Brand, Engl. Pflanzenr. IV.250: 125, 1907; Leptodactylon nuttallii var. floribundum Jeps., Man. Fl. Pl. Calif.: 808, 1925; L. floribundum Tides., Proc. Biol. Soc. Wash. 48: 42, 1935; Gilia nuttallii var. floribunda Munz, Man. S. Calif. Bot.: 399, 1935; Linanthus nuttallii var. floribundus McMinn, Man. S. Calif. Shrubs: 446, 1939; Linanthastrum nuttallii ssp. floribundum Ewan, J. Wash. Acad. Sci. 12: 141, 1942; Siphonella floribunda Jeps., Fl. Calif. 3: 219, 1943. Including Linanthastrum floribundum f. saxiphilum Wherry, Amer. Midl. Nat. 34: 386, 1945; (Linanthus saxiphilus A. Davids., Bull. S. Calif. Acad. Sci. 19: 10, 1920); and L. floribundus ssp. hallii Mason, Abrams Ill. Fl. Pac. St. 3: 431, 1951; (Siphonella floribunda var. hallii Jeps.,

Fl. Calif. 3: 219, 1943.)

Stems relatively tall and slender but firm; pubescence usually sparse; leaf-lobes 3 or solitary, narrow, firm, and somewhat acerose; cymes lax and few-flowered, the pedicels manifestly elongate; corolla up to 20 mm. long, though in some variants only half this.

Dry rocky slopes, S California to SW Colorado and No Mexico. Reported from Nevada and may well occur here, although no specimens have been seen.

2. LINANTHASTRUM NUTTALLII (Gray) Ewan, J. Wash. Acad. Sci. 32: 139, 1942.

Siphonella montana Nutt. ex Gray, Proc. Amer. Acad. Arts Sci. 8: 267, 1870; S. parviflora Nutt. ex Gray, loc. cit.; Gilia nuttallii Gray, loc. cit.; Navarretia nuttallii Kuntze, Rev. Gen. Pl. 2: 433, 1891; Linanthus nuttallii Greene ex Milliken, Univ. Calif. Publ. Bot. 2: 54, 1904; Leptodactylon nuttallii Rydb., Bull. Torr. Bot. Club 33: 149, 1906; Gilia nuttallii var. montana & parviflora Brand, Engl. Pflanzenr. IV.250: 125, 1907; Siphonella nuttallii Heller, Muhlenbergia 8: 57, 1912.

Stems stoutish, variable in height from 40 cm. with remote nodes to 8 cm. with crowded ones; leaf-lobes relatively numerous, rather narrowly or often broadly linear, herbaceous and only exceptionally firm; cymes dense, the flowers mostly subsessile, or rarely with distinct short pedicels; corolla varying in length from 8-15 mm.

Open rocky slopes, at moderate to high altitudes, Washington to Idaho, New Mexico, No Mexico and California. Specimens have been seen from Clark, Douglas, Elko, Humboldt, Lincoln, Lyon, Mineral, Nye, Ormsby

and Washoe Cos., Nevada. Brand, loc. cit., gave as representing his var. parviflora a collection by Baker 1053, from Kings Canyon, Ormsby Co. In general the material from the western part of the State is more pubescent than that from the eastern, but there seem to be no correlation between this and the other variable characters above noted, and no recognizable geographic trends in the latter, so subdivision into infraspecific taxa appears impracticable.

3. LINANTHASTRUM MELINGII (Wiggins) Wherry, Amer. Midl. Nat. 34: 386, 1945.

Leptodactylon melingii Wiggins, Contr. Dudley Herb. 1: 173, 1933.

Stems stoutish, 8-15 cm. high, with crowded nodes, the herbage variable in pubescence; leaf-lobes mostly 3, broadly linear, firm but scarcely acerose, 5-10 mm. long; inflorescence small, the cymes of few sessile or subsessile flowers; corolla 8-10 mm. long.

Rocky slopes in desert land, SE California, Baja California and adjacent Nevada, where known to have been collected in Nye and Esmeralda Cos.

The extensive lists of synonyms given under the two major taxa of this group indicate how uncertain many workers have been as to its systematic position. The reasoning which led Rydberg et al to assign these taxa to Leptodactylon is difficult to comprehend, for the only character in which they agree with that genus is the presence of a certain amount of woody tissue,whereas in calyx-features there could be no greater contrast. In "Gilia" nuttallii and its relatives the intersepaline membranes are of minimal width, whereas in Leptodactylon they constitute

practically the whole tube, the sepals proper being minimal. The suggestion of Greene (published by Milliken) that the present group belongs in Linanthus has found some favor; but since the generitype of this, L. dichotomus, has the same sort of calyx as Leptodactylon, consistency would require the inclusion of the latter also.

LEPTODACTYLON GROUP

9. LEPTODACTYLON Hook. & Arn., a single genus

GILIA, part, Benth., DC. Prodr. 9: 316, 1845. NAVARRETIA, part, Kuntze, Rev. Gen. Pl. 2: 433, 1891.

Plants low or prostrate shrubs. Leaves opposite at base and sometimes throughout, but often becoming subopposite and then alternate upward; the lower mostly palmately to pedately cleft, but at times pinnate especially toward inflorescence, the divisions slender and acicular. Flowers sessile or nearly so, borne in sparse cymes in upper leaf-axils, their respective parts usually numbering 5, 5, 5, and 3, but sporadically 6, 6, 6, and 4, or again 4, 4, 4, and 2. Sepals unequal, slender and acerose, united more than half their length by very broad membranes. Corolla salverform to funnelform, the tube longer than the petal-blades, which are delicate textured and pink, bronzy, yellow, cream, or white, when of the latter paler colors usually night-blooming. Stamens included, the filament united to the corolla-tube nearly throughout. Style shorter than the corolla-tube. Seeds several per locule, brown, with marginal wings, little changed when wet. (Name from Greek for slender fingers, in reference to the leaf-lobes.)

Nine species, 5 of them known in Nevada, (several considered only subspecifically distinct by some workers.)

KEY TO SPECIES

Habit prostrate or cespitose; leaves imbricated, subacerose.

Leaves opposite, to 15 mm. long; petals 5 . . . . . 1. L. WATSONI

Leaves alternate, to 6 mm. long; petals 4 . . . . 2. L. CAESPITOSUM

Habit ascending or upstanding; major leaves spaced, often with axillary fascicles of reduced ones, acerose; petals usually 5.

Costae of bracts and sepals manifestly laminar-bordered.

Leaf-lobes 3-7, the middle 1 1/2 times as long as the next outer ones; leaves mostly alternate . . . . . 3. L. LILACINUM

Leaf-lobes mostly 3, the middle 2-4 times as long as the next outer ones . . . . . 4. L. HALLII:

Opposite leaves continuing well up stem . . . . . f. HALLII

Opposite leaves limited to stem-base . . . . . f. SUBFLAVIDUM

Costae of bracts and sepals only obscurely laminar-bordered. 5. L. PUNGENS:

Leaf-length 7.5-15 mm.; lobes mostly 5.

Middle leaf-lobe little longer than the next outer ones, spreading or ascending . . . . . 5a. ssp. PUNGENS

Middle leaf-lobe twice as long as the next outer ones, markedly recurved . . . . . 5b. ssp. SQUARROSUM

Leaf-length 5-7 (-10) mm. . . . . 5c. ssp. BREVIFOLIUM

1. LEPTODACTYLON WATSONI (Gray) Rydb., Bull. Torr. Bot. Club 33: 149, 1906.

Gilia watsoni Gray, Proc. Amer. Acad. Arts Sci. 8: 267, 1870; Navarretia watsoni Kuntze, Rev. Gen. Pl. 2: 433, 1891.

Plant a sprawling shrub up to 20 cm. high, the herbage sparse-pubescent or glabrescent, the hairs in part gland-tipped; leaves opposite, palmately parted into 3-7 subacerose lobes up to 15 mm. long; sepals about 8 mm. long, the blade-costa laminar-bordered; corolla of 5 petals,

15–25 mm. long, cream-colored with purplish throat and bronzy exterior, opening in the evening and closing by mid-morning.

Dry rocky slopes, SE Idaho to W Colorado and central Utah, with a disjunct occurrence in Nye Co., Nevada.

The variant in the latter area is only about 10 cm. high, with gray-green herbage, leaves mostly 3-lobed and not over 10 mm. long, and petal-length about 15 mm. It may be the same as f. aridum (Jones) Wherry, Amer. Midl. Nat. 34: 383, 1945; Gilia floribunda var. arida Jones, Proc. Calif. Acad. Sci. (2) 5: 713, 1895. It does not agree with the description of the latter, however, and needs further study.

2. LEPTODACTYLON CAESPITOSUM Nutt., J. Acad. Nat. Sci. Phila. (2) 1: 157, 1848.

Gilia pungens var. caespitosa Gray, Proc. Amer. Acad. Arts Sci. 8: 268, 1870; Navarretia caespitosa Kuntze, Rev. Gen. Pl. 2: 433, 1891; Gilia caespitosa Nels., Bull. Torr. Bot. Club 25: 546, 1898, non Gray, Proc. Amer. Acad. Arts Sci. 12: 80, 1877.

Plant a cespitose to pulvinate subshrub, mostly under 7 cm. high, with the aspect of a dwarf Phlox, for which it is often mistaken; leaves densely imbricated, all but the lowest alternate, mostly with 3 subacerose lobes; sepals about 7 mm. long, the blade-costa laminar-bordered; 4-petalled corolla about 15 mm. long, whitish, open during the day.

Dry gravelly flats and slopes, Wyoming to W Nebraska, S Utah, and Nevada, where known to have been collected in Elko, Eureka, Nye and White Pine Cos.

3. LEPTODACTYLON LILACINUM Greene val. Brand, Engl. Pflanzenr. IV.250: 128, 1907.

Gilia lilacina Brand, loc. cit.; Leptodactylon pungens ssp. pulchriflorum (Brand) Mason,(*) Abrams Ill. Flora Pac. St. 3: 455, 1951; based on Gilia pungens ssp. pulchriflora Brand, Ann. Cons. Jard. Gen. 15 & 16: 333, 1913; Leptodactylon lilacinum f. pulchriflorum Wherry, Amer. Midl. Nat. 34: 384, 1945 (an east-Californian taxon.)

Plant a shrub up to 30 cm. high, with dark green often glandular herbage; leaves mostly alternate, to 15 mm. long, 3-7 (usually 5) -lobed, the middle 1 1/2 times the next outer ones; bracts and sepals with manifest herbaceous laminar borders to the costa; corolla 20-25 mm. long, the limb yellowish to pinkish white, the outer surface of tube and petal-blade often bronzy, fragrant, especially at night.

Sunny mountain slopes at moderate to high altitudes, Oregon to California and central Nevada, where known in Clark, Douglas, Esmeralda, Lander, Lyon, Mineral, Nye, Ormsby, Storey and Washoe Cos.

4. LEPTODACTYLON HALLII (Parish) Heller, Muhlenbergia 1: 146, 1906.

Gilia hallii Parish, Erythea 7: 94, 1899; G. pungens var. hallii Milliken, Univ. Calif. Publ. Bot. 2: 42, 1904; G. pungens ssp. hallii Brand, Engl. Pflanzenr. IV.250: 128, 1907; Leptodactylon pungens var. hallii Jeps., Man. Fl. Pl. Calif.: 807, 1925.

Plant a straggly shrub to 50 cm. high, the herbage varying from glandular to glabrescent; leaves mostly 3-lobed, the middle 3-4 times as

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(*) The interpretation of taxa by Mason in Abrams Ill. Fl. Pac. St. differs considerably from that here adopted.

long as the outer; lobes of bracts and sepal-blade laminar-bordered; corolla 18-22 mm. long, yellowish to pinkish white, opening mostly in the evening.

Dry slopes and flats, central California to S Nevada.

Separable into two forms, hallii with the leaves opposite well up the stems; and subflavidum Wherry, Amer. Midl. Nat. 34: 384, 1945, based on Leptodactylon pungens var. subflavidum Jeps., Fl. Calif. (3) 2: 143, 1943, with the leaves opposite only at stem-base.

In Nevada the typical form is known to have been collected in Clark, Douglas, Humboldt, Lander, Lyon, Mineral and Nye Cos.; the f. subflavidum in Esmeralda and Lincoln Cos.

5. LEPTODACTYLON PUNGENS (Torr.) Rydb., Fl. Colo.: 279, 1906.

Cantua ? pungens Torr., Ann. Lyc. Nat. Hist. N. Y. 2: 221, 1828; Batanthes pungens Raf., Atl. J. 1, No. 4: 145, 1832; Aegochloa ? torreyi Don, Gen. Syst. Dichl. Pl. 4: 246, 1838; Gilia pungens Benth., DC. Prodr. 9: 316, 1845, non Dougl. ex Hook., 1830; Leptodactylon pungens Nutt., J. Acad. Nat. Sci. Phila. (2) 1: 157, 1848, informal publication; Navarretia pungens Kuntze, Rev. Gen. Pl. 2: 433, 1891.

Plant a straggly or compact shrub to 50 cm. high, the herbage gray-green, glabrescent to pilose, the hairs pointed or with minute globular tips, not normally viscid-glandular; leaves opposite below, becoming sub-opposite and ultimately alternate toward stem-tip, mostly 5-lobed, the lobes acerose, the midrib, as well as the costa of bract-lobes and sepals, only obscurely laminar-bordered; corolla light yellow to white, sometimes with purple throat, often bronzy on outer surface of tube and pet-

al-blades, opening in the evening and closing early the next day.

Dry rocky or gravelly slopes at moderate altitudes.

Separable into 4 subspecies, of which 3 are known in Nevada:

5a. LEPTODACTYLON PUNGENS ssp. PUNGENS

Gilia pungens ssp. eupungens Brand, Engl. Pflanzenr. IV.250: 126, 1907; Leptodactylon pungens ssp. eupungens Wherry, Amer. Midl. Nat. 34: 383, 1945.

Many leaves 12-15 mm. long, their middle lobe little longer than the next outer ones, ascending or spreading; corolla 18-25 mm. long.

E Washington to W Nebraska, New Mexico and Nevada, in which specimens have been seen from Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Nye and Washoe Cos.

5b. LEPTODACTYLON PUNGENS ssp. SQUARROSUM (Gray) Tides., Proc. Biol. Soc. Wash. 48: 42, 1935.

Gilia pungens var. squarrosa Gray, Proc. Amer. Acad. Arts Sci. 8: 268, 1870; Cantua pungens var. squarrosa Howell, Fl. NW. Amer. 1, fasc. 4: 453, 1901; Leptodactylon patens Heller, Muhlenbergia 1: 146, 1906; Gilia pungens ssp. eu-pungens var. devestita Brand, Engl. Pflanzenr. IV.250: 128, 1907.

Leaves mostly 10-12 mm. long, their middle lobe 1 1/2 to 2 times as long as the next outer, conspicuously recurved; corolla about 15 mm. long.

E Oregon to W Colorado and Nevada, in which specimens have been seen from Douglas, Elko, Humboldt, Nye, Ormsby, Washoe and White Pine Cos.

5c. LEPTODACTYLON PUNGENS ssp. BREVIFOLIUM (Rydb.) Wherry, Amer. Midl. Nat. 34: 383, 1945.

Leptodactylon brevifolium Rydb., Bull. Torr. Bot. Club 40: 474, 1913.

Leaves mostly 5-7 mm. long, but the uppermost often to 10 mm., their middle lobe somewhat longer than the next outer, spreading or subrecurved; corolla 15-20 mm. long.

E Washington to Utah, New Mexico and Nevada, in which specimens have been seen from Elko, Lander, Lincoln, N Washoe and White Pine Cos.

(LEPTODACTYLON PUNGENS ssp. HOOKERI (Dougl. ex Hook.) Wherry, Amer. Midl. Nat. 34: 383, 1945, has been reported from Nevada, but no material has been seen which corresponds to the original representative of this taxon: it is like ssp. pungens in most respects, but differs in its herbage being copiously pubescent with hairs tipped by large viscid glands; it ranges from S British Columbia to N California, chiefly at rather high altitudes.)

LINANTHUS GROUP

10. LINANTHUS Benth., a single genus

GILIA, part, Benth., Edw. Bot. Reg. 19: pl. 1622, text, 1833. NAVARRETIA, part, Kuntze, Rev. Gen. Pl. 2: 433, 1891. Including FENZLIA and LEPTOSIPHON Benth., loc. cit.

Plants small or moderate sized annuals. Leaves opposite, palmately cleft into slender divisions, at times reduced to solitary blades. Inflorescence of cymose pattern, ranging from a bracted head of subsessile flowers to a sparse group of long-pedicelled ones, and again reduced to solitary axillary flowers. Sepals 5, varying from subulate and united

by broad membranes (as in Leptodactylon) to broadly linear with narrow membranes (as in most species of Gilia), these usually entire but at times cleft shallowly or rather deeply (the calyx then resembling that of an Arenaria, of the Caryophyllaceae). Corolla ranging from campanulate to funnelform and to subsalverform, sometimes with an elongate slender tube, the 5 petal-blades often showy, yellow, purple, pink, or white. Stamens 5, usually equal in length, the filament adnate nearly throughout the length of the corolla-tube. Carpels 3, the compound style included or exserted, the 3 stigmatic tips prominent. Seeds variable in shape, color, and response to wetting. A polyphyletic group, some members annual derivatives of Leptodactylon, others of Linanthastrum, and still others from now extinct perennial ancestors. (Name from Latin for flax and Greek for flower, in reference to the aspect of certain species.)

About 35 species, 10 of them in Nevada.

KEY TO SPECIES

1. Corolla campanulate to funnelform.

(SUBGENUS PARRYA)

2. Flowers subsessile; intersepaline membranes deeply parted; corolla about 6 mm. long, white . . . . . 1. L. DEMISSUS

(SUBGENUS DACTYLOPHYLLUM)

2. Flowers pedicellate; intersepaline membranes moderately parted.

3. Pedicels little-exceeding flowers; corolla 10 mm. long, yellow or cream with purple throat . . . . . 2. L. AUREUS

3. Pedicels much-exceeding flowers; corolla white, pink or lavender.

4. Corolla-length 6-10 mm. . . . . 3. L. PHARNACEOIDES

4. Corolla-length under 6 mm.

5. Filament-base pubescent; seeds few . 4. L. SEPTENTRIONALIS

5. Filament-base glabrous; seed solitary . . 5. L. HARKNESSII

1. Corolla subsalverform, the tube dilated upward to form a throat.

(SUBGENUS LEPTOSIPHON)

6. Inflorescence compact, multiflorus . . . . . 6. L. CILIATUS

(SUBGENUS LINANTHUS)

6. Inflorescence of sparse, open cymes or solitary flowers.

7. Calyx glabrous; corolla large, white or pink.

8. Corolla-limb 2.5 cm. across . . . . . 7. L. DICHOTOMUS

8. Corolla-limb 1.5 cm. across . . . . . 8. L. BIGELOVII

7. Calyx pubescent; corolla small, yellow.

9. Plant compact; leaf-lobes often 3 . . . . . 9. L. ARENICOLA

9. Plant lax; leaf-lobes often solitary . . . . . 10. L. JONESII

1. LINANTHUS DEMISSUS (Gray) Greene, Pittonia 2: 257, 1892.

Gilia "dactylophyllum" Torr., Rept. Colo. R., Ives, Bot.: 22, 1860; G. demissa Gray, Proc. Amer. Acad. Arts Sci. 8: 263, 1870; Navarretia demissa Kuntze, Rev. Gen. Pl. 2: 433, 1891; Linanthus dactylophyllum Rydb., Fl. Rocky Mts.: 689, 1917; L. demissum Mason in Abrams Ill. Fl. Pac. St.: 424, 1951.

Plant erect or spreading, somewhat pubescent, 2-10 cm. high; leaf-lobes 1-5, usually 3; bracts alternate; flowers subsessile, in sparse cymes; sepals linear, their broad junction-membranes parted nearly to the base, leaving conspicuous white margins to the green sepal-tissue; corolla subcampanulate, with very short tube, long open throat, and

spreading petal-blades about as long as united part, white with purplish lines below; stamens included, somewhat unequal; stigmas slightly exserted; locules of capsule several-seeded.

Dry sandy and rocky land, S California to Utah and Arizona; known throughout Clark and adjacent Lincoln and Nye Cos., Nevada.

2. LINANTHUS AUREUS (Nutt.) Greene, Pittonia 2: 257, 1892.

Gilia aurea Nutt., J. Acad. Nat. Sci. Phila. (2) 1: 155, 1848; Leptosiphon aureus "Benth." Vilm.-Andr., Fl. Pl. Terre, ed. 2: 470, 1866; Navarretia aurea Kuntze, Rev. Gen. Pl. 2: 433, 1891; Dactylophyllum aureum Heller, Muhlenbergia 2: 231, 1906.

Plant erect to wide-spreading, up to 10 cm. high and sometimes twice as broad, the herbage glabrous to somewhat pubescent with gland-tipped hairs; leaf-lobes mostly 3, linear and apiculate; inflorescence open-cymose, the pedicels shorter than to slightly exceeding flowers; sepals broadly linear, with conspicuous junction-membranes over half their length; corolla funnelform-campanulate, with tube shorter than throat; stamens equal, barely exserted; stigmas elongate, well-exserted; locules of capsule several-seeded.

Dry sandy slopes, S California and Baja California to New Mexico. In Nevada rare, and known only in S Clark Co.

This taxon is divisible into two on the basis of flower color: in L. aureus ssp. aureus the corolla is bright yellow, while in L. aureus ssp. decorus (Gray) Mason in Abrams Ill. Fl. Pac. St. 3: 419, 1951 (Gilia aurea var. decora Gray, Proc. Amer. Acad. Arts Sci. 8: 264, 1870) it is cream-colored with purple throat. The Nevada collections include both.

3. LINANTHUS PHARNACEOIDES (Benth.) Greene, Pittonia 2: 254, 1892.

Gilia pharnaceoides Benth., Edw. Bot. Reg. 19: pl. 1622 text, 1833; G. liniflora var. pharnaceoides Gray, Proc. Amer. Acad. Arts Sci. 8: 263, 1870; G. liniflora ssp. pharnaceoides Brand, Engl. Pflanzenr. IV.250: 133, 1870; Linanthus liniflorus ssp. pharnaceoides Mason in Abrams Ill. Fl. Pac. St. 3: 418, 1951. Including Gilia tenella Nutt. ex Gray, loc. cit.

Plant erect, 10-50 cm. high, simple or few-branched, the herbage glabrous to somewhat pubescent; leaf-lobes 3-9, linear; inflorescence openly cymose, the flowers on long slender pedicels; sepals linear with narrow junction-membranes; corolla 6-10 mm. long, with the throat equalling or somewhat longer than the tube, white, pink, or lavender; stamens equal, short-exserted, basally pubescent; stigmas 1 mm. long; locules of capsule 1-2-seeded.

Rocky or gravelly mountain slopes, Washington to Idaho, Utah and Baja California. In Nevada widespread though not very common, having been collected at one or two localities each in Elko, Eureka, Humboldt, Lander, Washoe and White Pine Cos.

4. LINANTHUS SEPTENTRIONALIS Mason, Madroño 4: 159, 1938.

Linanthus harknessii var. septentrionalis Jeps. & Bail. in Jeps. Fl. Calif. 3: 210, 1943.

Plant erect, to 30 cm. high, repeatedly dichotomously branched, the herbage glabrescent or somewhat pubescent; leaf-lobes 5-7, linear; inflorescence a panicle of sparse cymes or rarely solitary flowers, the pedicels long and slender; sepals linear-subulate, their broad junction-

membranes parted to about the middle, leaving white margins on the green sepal-tissue; corolla short-funnelform, 2-4 mm. long, manifestly exceeding the calyx, white or pale lavender; stamens equal, slightly exserted, the filaments basally pubescent; stigmas 1 mm. long; locules of capsule 2-4-seeded.

Gravelly mountain slopes, central British Columbia to W Montana, Utah, and the E slope of the California Sierras. Known throughout N Nevada, the county list being Churchill, Elko, Humboldt, Lander, Mineral, Nye and Washoe.

5. LINANTHUS HARKNESSII (Curran) Greene, Pittonia 2: 255, 1892.

Gilia harknessii Curran, Bull. Calif. Acad. Sci. 1: 12, 1884; Navarretia harknessii Kuntze, Rev. Gen. Pl. 2: 433, 1891; Gilia pharnaceoides var. harknessii Jones, Contr. W. Bot. 12: 55, 1908.

Plant erect, to 15 cm. high, dichotomously branched upward, the herbage minutely bristly to glabrescent; leaf-lobes 3-5, linear; inflorescence a panicle of sparse cymes and solitary flowers, the pedicels long and slender; sepals linear-subulate, their junction-membranes deeply parted; corolla short-funnelform, 2-3 mm. long, scarcely exceeding the calyx, white or pale lavender; stamens included, the filaments glabrous; stigmas minute; locules of capsule 1-seeded.

Open gravelly slopes at rather high altitudes in the Pacific Border and Cascade-Sierra mountains, Washington to central California; known to have been collected only in S Washoe Co., Nevada. Most reports of the occurrence of this species in Nevada (and farther east) refer to the next-preceding taxon.

6. LINANTHUS CILIATUS (Benth.) Greene, Pittonia 2: 260, 1892.

Gilia ciliata Benth., Pl. Hartw. 325, 1849; Navarretia ciliata Kuntze, Rev. Gen. Pl. 2: 433, 1891; Leptosiphon ciliatus Jeps., School Fl. : 77, 1902. Including Linanthus neglectus Greene, Erythea 3: 24, 1895; Gilia ciliata var. neglecta Brand, Engl. Pflanzenr. IV. 250: 137, 1907; Linanthus ciliatus var. neglectus Jeps., Man. Fl. Pl. Calif.: 806, 1925.

Plant erect, to 30 cm. high, simple or branched from base, the herbage often bearing stiff coarse hairs; leaf-lobes 5-11, linear, conspicuously ciliate; inflorescence a compact, head-like cyme subtended by leafy bracts; sepals broadly subulate, coarsely ciliate, with broadish junction-membranes about half their length; corolla sub-salverform, 12-25 mm. long, with a long slender tube, short throat, and obovate petal-blades about 3 mm. long, pink to white, often with purple striae at blade base and yellow throat; stamens somewhat exserted, but 1 mm. long stigmas scarcely so; locules of capsule few-seeded.

Rocky mountain sides and sandy slopes, Oregon to S California and W Nevada, where known in Douglas, Ormsby and Washoe Cos. The taxon to which the epithet neglectus has been applied in various combinations is here regarded as a mere depauperate form unworthy of nomenclatorial recognition; it occurs locally in Nevada together with the typical form.

7. LINANTHUS DICHOTOMUS Benth., Edw. Bot. Reg. 19: pl. 1622 text, 1833.

Gilia linanthus Steud., Nom., ed. 2, 1: 683, 1840; G. dichotoma Benth., DC. Prodr. 9: 314, 1845; Navarretia dichotoma Kuntze, Rev. Gen. Pl. 2: 433, 1891.

Plant erect, to 30 cm. high, simple or sparingly branched, the herbage usually glabrous; leaf-lobes mostly 3-5 but sometimes solitary, linear; inflorescence cymose, of few or solitary flowers in axils of the branches; sepals linear-subulate, with high and broad junction-membranes like those in Leptodactylon, from which this and the 3 following taxa are believed to have been derived by reduction in woody tissue and duration; corolla funnelform-subsalverform, the throat very short, the limb about 2.5 cm. across, white with bronzy exterior, opening at dusk and closing at dawn, with powerful aromatic fragrance; stamens equal, included; stigmas elongate, lower than the anthers; locules of capsule several-seeded.

Dry gravelly or clayey slopes and flats, S California to Arizona. In Nevada known only in Clark and Nye Cos.

8. LINANTHUS BIGELOVII (Gray) Greene, Pittonia 2: 253, 1892.

Gilia dichotoma var. parviflora Torr., Mex. Bound. Surv., Botany 2: 147, 1859; G. bigelovii Gray, Proc. Amer. Acad. Arts Sci. 8: 265, 1870; Navarretia parviflora Kuntze, Rev. Gen. Pl. 2: 433, 1891.

Plant erect, to 25 cm. high, simple or sparingly branched, the herbage glabrous; leaf-lobes 3, 2, or solitary, linear; inflorescence of few or solitary flowers in forks of ~~its~~ the branches; sepals narrowly linear, with very broad junction-membranes; corolla funnelform-subsalverform, with obscure throat, the limb about 1.5 cm. across, white or cream colored, with bronzy exterior, opening in evening, fragrant; stamens and elongate stigmas included; locules of capsule few-seeded.

Desert washes, California to Utah and Texas. Known to have been collected in Clark, Nye and S Washoe Cos., Nevada.

9. LINANTHUS ARENICOLA (Jones) Jeps. & Bail. in Jeps. Fl. Calif. 3: 205, 1943.

Gilia arenicola Jones, Contr. W. Bot. 13: 2, 1910.

Plant erect, to 10 cm. high, simple or with short branches, somewhat pubescent; leaves mostly 3-lobed; flowers usually solitary, subsessile; sepals narrowly linear, somewhat unequal, with broad junction-membranes, often pubescent inside the tip; corolla about 6 mm. long, little-exceeding calyx, yellow with purple throat; stamens and elongate stigmas included; locules of capsule several-seeded, the seeds reniform.

Desert sands, often in alkaline or gypsum-bearing land, S California to S Utah. Known to have been collected only in Esmeralda Co., Nevada.

10. LINANTHUS JONESII (Gray) Greene, Pittonia 2: 254, 1892.

Gilia jonesii Gray, Syn. Fl. N. Amer., ed. 2, 2.pt. 1: 407, 1886; Navarretia jonesii Kuntze, Rev. Gen. Pl. 2: 433, 1891; Gilia bigelovii var. jonesii Brand, Engl. Pflanzenr. IV.250: 144, 1907; Linanthus bigelovii var. jonesii Jeps. & Mason in Jeps. Man. Fl. Pl. Calif.: 802, 1925.

Plant erect, 5-20 cm. high, repeatedly branched, glabrous below; leaf-lobes mostly solitary; flowers solitary, subsessile; sepals narrowly linear with broad junction-membranes, sparsely glandular-pubescent; corolla about 10 mm. long, yellow; stamens and short stigmas included; locules of capsule bearing few reniform seeds.

Desert slopes and flats, S California to Arizona and Baja California. In Nevada known to have been collected at a few localities in Clark Co.

GILIA GROUP : KEY TO GENERA

Corolla campanulate, funnelform, or subsalverform, when the last having a definite throat . . . . . 11. GILIA

Corolla salverform or somewhat funnelform, when the latter lacking a throat . . . . . 12. IPOMOPSIS

11. GILIA Ruiz & Pav.

Plants woody-based or wholly herbaceous perennials, rarely biennials, winter- or mostly spring-annuals. Leaves alternate, sometimes forming a basal rosette. Inflorescence usually a panicle of small cymes. Calyx of 5 sepals united by scarious membranes which rupture as the capsule expands. Corolla of 5 petals united below, ~~to a corolla which may be~~ campanulate, funnelform or subsalverform, in the last case having a definite throat. Stamens ranging from equal to markedly unequal. Carpels united, forming a trilocular ovary tipped by a slender style, the terminal stigmatic portions elongate, short, or exceptionally reduced to a mere knob. (Name in honor of F. Gil) Divisible into 3 subgenera:

KEY TO SUBGENERA

Corolla campanulate; leaves simple . . . . . 1. CAMPANULASTRUM

Corolla funnelform to subsalverform.

Blades or lobes of rosette-leaves shallowly toothed, glandular; seeds unchanged when wet . . . . . 2. GILIANDRA

Blades of rosette-leaves otherwise; seeds mostly becoming viscid when wet . . . . . 3. GILIA

SUBGENUS 1. CAMPANULASTRUM : KEY TO SPECIES

Leaves linear-lanceolate to elliptic, entire or few-toothed; petals 6-10 mm. long, united over half their length; stamens somewhat unequal. 1. G. CAMPANULATA

Leaves narrowly linear, entire; petals 4-6 mm. long, united less than half their length; stamens equal . . . . . 2. G. FILIFORMIS

1. GILIA CAMPANULATA Gray, Proc. Amer. Acad. Arts Sci. 8: 279, 1870.

Navarretia campanulata Kuntze, Rev. Gen. Pl. 2: 433, 1891.

Plant a spreading annual, up to 15 cm. high and nearly as wide, the herbage sparsely glandular; leaves reduced to solitary lanceolate blades, sometimes obscurely toothed, 6-10 mm. long. Flowers solitary or paired, the pedicels in part arising opposite leaves; sepals linear, their junction-membranes cleft over half their height; corolla up to 10 mm. long, with very short tube, elongate narrow-campanulate throat, and small petal-blades, yellow grading to white at blade-tip; stamens unequal, adnate only to corolla-tube, only the longest exserted; stigmas short, included; locules of capsule several-seeded, the seeds somewhat angled.

Dry sandy flats at moderate altitudes, S California and adjacent Nevada, where known to have been collected in Clark, Esmeralda, Mineral, Pershing and S Washoe Cos. The type was a collection by S. Watson in 1868, from "foothills of Trinity Mountains," thus presumably in Pershing Co., preserved in the Gray Herbarium.

2. GILIA FILIFORMIS Parry ex Gray, Proc. Amer. Acad. Arts Sci. 10: 75, 1874.

Navarretia filiformis Kuntze, Rev. Gen. Pl. 2: 433, 1891; Tintinabulum filiforme Rydb., Fl. Rocky Mts.: 698, 1917.

Plant a branching annual up to 15 cm. high, the herbage glabrous; leaves reduced to solitary narrowly linear blades up to 5 cm. long, the

lower sometimes opposite; flowers solitary or paired, on pedicels up to 15 mm. long, arising from stems opposite reduced leaves. Sepals narrowly linear, their junction-membranes cleft over half their height; corolla up to 6 mm. long, with practically no tube and throat shorter than the petal-blades, bright yellow. Stamens equal, adnate up to the middle of the throat, somewhat exserted; stigmas short, exceeding the anthers; locules of capsule several-seeded.

Dry rocky slopes and flats, SE California to Utah and Arizona. In Nevada known to have been collected at many places in Clark and one in S Nye Co.

SUBGENUS 2. GILIANDRA : KEY TO SPECIES

Corolla 15-20 mm. long, intense red . . . . . 3. G. SUBNUDA

Corolla under 13 mm. long, violet to white.

Leaves cut more than half their width to toothed lobes; flowers 8-12 mm. long, variously mottled violet, yellow and white. 4. G. HUTCHINSIFOLIA

Leaves cut less than half their width to cuspidate teeth; flowers under 7 mm. long, white with lavender markings.

Pedicels erect; corolla 4-6 mm. long . . . . . 5. G. LEPTOMERIA

Pedicels reflexed; corolla 3 mm. long . . . . . 6. G. MICROMERIA

3. GILIA SUBNUDA Torr. ex Gray, Proc. Amer. Acad. Arts Sci. 8: 276, 1870. Navarretia subnuda Kuntze, Rev. Gen. Pl. 2: 433, 1891. Including Gilia superba Eastw., Zoe 4: 122, 1893; G. subnuda ssp. superba Brand, Engl. Pflanzenr. IV.250: 119, 1907.

Plant biennial with conspicuous rosette, the stem 15-50 cm. high, mostly branched, pubescent especially upward with gland-tipped hairs;

rosette leaves thick, obovate, up to 3 x 6 cm.; subentire to shallowly pinnatifid, the lobes obtusish; cauline leaves few, minute, entire; inflorescence a panicle of small cymes; sepals about 6 mm. long, united half their length by narrow membranes; corolla 15-20 mm. long, subsalverform, with a distinct throat about 5 mm. and petal-blades 6-8 mm. long, slightly purplish red with yellow eye; stamens adnate to the corolla-tube nearly throughout their length, the anthers included; stigmas rather short, level with the anthers; locules of capsule few-seeded, the seeds somewhat wing-angled, pale and translucent, unchanged when wet.

Dry sandy slopes, Nevada to W Colorado, New Mexico and Arizona. The type specimen, preserved in the Gray Herbarium, was collected by Stretch at an undesignated locality in Nevada. The taxon to which the epithet superba was applied is regarded as a mere glandular form. It was reported from Nevada, but no specimens from there have been seen.

4. GILIA HUTCHINSIFOLIA Rydb., Bull. Torr. Bot. Club 40: 472, 1913. Gilia arenaria ssp. leptantha var. rubella Brand, Engl. Pflanzenr. IV.250: 103, 1907; G. leptomeria ssp. rubella Mason & Grant, Madroño 9: 214, 1948.

Plant a spring or winter annual with conspicuous basal rosette, and 1-5 stems which branch toward tip, 5-15 or sometimes 30 cm. high, the herbage mostly glandular-pubescent; rosette-leaves oblong, 5-10 cm. long x 5-15 mm. wide, pinnately cut more than half their width into broad short-toothed lobes; cauline leaves chiefly linear, entire; inflorescence a panicle of few-flowered cymes; sepals linear with narrow junction-membranes; corolla mostly 6-10 mm. long, funnelform, with long often

lilac tube, short yellow violet-spotted throat, and broadish violet to whitish limb; stamens adnate nearly throughout their length to the corolla-tube, the anthers included; stigmas short, about level with the anthers. Locules of capsule many-seeded.

Dry sandy and gravelly slopes, often over red sandstone, dust from which adhering to the plant's glands led to use of the epithet rubella, S California to SW Utah and Arizona. In Nevada known to have been collected in Clark, Esmeralda, Lincoln and Nye Cos.

5. GILIA LEPTOMERIA Gray, Proc. Amer. Acad. Arts Sci. 8: 278, 1870. Navarretia leptomeria Kuntze, Rev. Gen. Pl. 2: 433, 1891. Regarded as including Gilia triodon Eastw., Zoe 4: 121, 1893: G. leptomeria var. tridentata Jones, Proc. Calif. Acad. Sci., ser. 2, 5: 713, 1895; Aliciella triodon Brand, Helios 22: 77, 1905; A. triodon var. humillima Brand, Engl. Pflanzenr. IV.250: 150, 1907.

Plant an annual with well-developed basal rosette, and a few stems 5-10 or in moist seasons to 30 cm. high, branched upward, sparsely to moderately glandular-pubescent; rosette-leaves narrowly oblong to oblanceolate, 2-4 (rarely 8) cm. long and 3-6 (rarely 15) mm. wide, shallowly cut into cuspidate lobes; cauline leaves linear, entire or nearly so; inflorescence a panicle of small cymes; sepals about 3 mm. long, united over half their length by narrow membranes; corolla funnelform, 4-6 mm. long, with a short but distinct throat; petal-blades oval, 1.5 mm. long, entire or terminally cut into 3 teeth, white usually with lavender striae on tube and blade; stamens adnate to corolla nearly throughout their length, somewhat exserted; stigmas minute; locules of capsule many-

seeded, the brown seeds little affected by moisture.

Damp clayey to dry sandy flats and slopes, E Washington to Wyoming, Colorado and SE California. Known nearly throughout Nevada, specimens having been seen from Churchill, Clark, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Nye, Ormsby, Pershing, Washoe and White Pine Cos. While no definite type locality was mentioned in the original description, there is a specimen in the Gray Herbarium annotated by Gray in such a way that it is to be regarded as the type: Watson 927, June, 1868, Unionville Valley, 4700 ft., Pershing Co., Nevada.

The variant with toothed petal-blades has been regarded by various workers as representing a distinct variety, species, and even genus, but is here considered as unworthy of nomenclatorial recognition.

6. GILIA MICROMERIA Gray, Proc. Amer. Acad. Arts Sci. 8: 279, 1870. Navarretia micromeria Kuntze, Rev. Gen. Pl. 2: 433, 1891; Gilia leptomeria ssp. micromeria Mas. & Grant, Madroño 9: 214, 1948.

Plant with the habit of the next-preceding taxon, but smaller and with reduced inflorescence, the flowers borne mostly singly or in pairs on slender reflexed pedicels; sepals only about 2 and corolla 3 mm. long; locules of capsule 1-2-seeded.

Dry sandy land, E Oregon to Utah and S California. In Nevada known to have been collected in Churchill, Elko, Esmeralda, Lyon, Ormsby and Washoe Cos. Again no definite type locality was given in the original description, but what is to be regarded as Gray's type is preserved in the Gray Herbarium: Watson 928, May, 1868, from Humboldt Lake, presumably in Pershing Co., Nevada.

SUBGENUS 3. GILIA : KEY TO SECTIONS

Pubescence of an arachnoid-woolly type present . . . . . 1. ARACHNION

Pubescence of an arachnoid-woolly type absent.

Plant leafy with little if any basal rosette; leaves linear, mostly entire . . . . . 2. SALTUGILIA (part)

Plant scapose with well-developed basal rosette; leaves mostly toothed or dissected.

Leaves relatively narrow, dissected.

Capsules longer than broad . . . . . 2. SALTUGILIA (part)

Capsules broader than long . . . . . 3. GILMANIA (part)

Leaves relatively broad, toothed or incised . 3. GILMANIA (part)

SECTION 1. ARACHNION : KEY TO SPECIES AND SUBSPECIES

(Contributed by Verne Grant and Alva Grant.)

1. Pedicels of a pair subequal in length; flowers showy, corolla 8–29 mm. long; upper corolla throat light to deep violet.

2. Corolla throat full, abruptly expanded; corolla form ample (ratio of tube and throat length to orifice width = 1.5-2.5); corolla lobes narrower than orifice; stamens slightly exserted from orifice. Fairly widespread in the south . 7a. G. CANA ssp. TRICEPS

2. Corolla throat narrow, flaring gently from tube; corolla form slender (ratio of tube and throat length to orifice width = 3.0-4.5); corolla lobes wider than orifice; stamens maturing just at orifice. Uncommon . . . . . 7b. G. CANA ssp. SPECIFORMIS

1. Pedicels of a pair very unequal in length; flowers not showy, often inconspicuous, corolla 3.7-12 mm. long; upper corolla throat mostly yellow or white, frequently with purple or yellow spots, but only rarely violet.

3. Stamens and style long-exserted from orifice of corolla throat 8. G. LEPTANTHA

3. Stamens and style short-exserted or maturing at orifice of corolla throat or one stamen well-exserted.

4. Lower stems glabrous and glaucous; cauline leaves shallowly dentate with broad rachis; calyx glands with large, usually

yellow head and short stipe . . . . . 11. G. SINUATA

4. Lower stems cobwebby-pubescent; cauline leaves dentate to deeply lobed with broad to narrow rachis, the lobes as long as or usually longer than the rachis width; calyx glands, when present, frequently with small, usually black head and long stipe.

5. Cauline leaves more or less clasping at base, coarsely dentate with broad rachis; foliage bright green with usually a sparse cobwebby pubescence; corolla tube and lower throat deep purple (except in white-flowered individuals) . . . . . 10. G. MODOCENSIS

5. Cauline leaves not clasping, variously dissected with narrow or moderately broad rachis, not coarsely dentate; foliage dark green or grayish green with usually a dense cobwebby pubescence; corolla tube and throat either deep or pale in color.

6. Inflorescence glomerate; pedicels and calyces heavily glandular . . . . . 9. G. BRECCIARUM

6. Inflorescence diffuse; pedicels and calyces lightly glandular to glabrous or cobwebby pubescent.

7. Calyx lobes acute to somewhat acuminate, terminating shortly (less than 0.5 mm.) beyond the bordering sinus membrane; calyx glabrous or moderately pubescent; basal leaves once or twice pinnately dissected.

8. Upper corolla throat yellow or white, often marked or suffused with purple; calyx moderately glandular or rarely glabrous or cobwebby; inflorescence branches strict, not divaricate.

9. Leaves once or twice pinnate, with rachis 1.0-3.5 mm. wide, often broader than the lobes and lobes 1-4 times as long as rachis width; upper corolla throat yellow or if white then suffused with purple from tube.

10. Spreading plants with strong flexuous stems; corolla throat pale yellow or sometimes white suffused with purple; tetraploid 12. G. INCONSPICUA

10. Erect plants with delicate stems; corolla throat bright yellow with a pair of dark purple markings just below each lobe; diploid . . . . . 13. G. INTERIOR

9. Leaves once pinnate, with rachis and lobes equally narrow (1.0-1.5 mm. wide) and the lobes 3-9 times as long as rachis width; upper corolla throat white . . . . 14. G. TRANSMONTANA

8. Upper corolla throat white, not suffused with purple; calyx glabrous or lightly cobwebby, not glandular; inflorescence branches divaricate 15. G. ALIQUANTA

7. Calyx lobes acuminate, prolonged narrowly (0.5-) 1.0 -1.5 mm. beyond the bordering sinus membrane; calyx very sparsely pubescent; basal leaves bipinnately dissected . . . . . 16. G. OPHTHALMOIDES

7. GILIA CANA (Jones) Heller, Muhlenbergia 2: 266, 1907.

Gilia latiflora var. cana Jones, Contrib. West. Bot. 8: 35, 1898.

Erect plants with 1 to several rather stout stems 1-3 dm. tall, cobwebby-pubescent at base; leaves in a basal rosette, densely matted with cobwebby pubescence, bipinnately lobed or toothed, rachis narrow, 0.5-3.0 mm. wide, the lobes broader; upper leaves reduced to pinnately lobed bracts; inflorescence divaricately branched and full, broadly spreading, the pedicels 6-20 mm. long in subequal pairs, the flowers showy; calyx glandular; corolla 8-29 mm. long, mostly with a full, abruptly expanded throat and broad oval lobes; corolla tube purple, throat yellow below and violet above, orifice violet, lobes pinkish-violet; stamens subequal and short, maturing at orifice or slightly exserted; style exserted from orifice; capsule globular, 4.3-7.3 mm. long; diploid.

Mojave Desert and bordering mountains to the west. Represented here by 2 subspecies:

7a. GILIA CANA ssp. TRICEPS (Brand) A.& V. Grant, El Aliso 3: 231, 1956.

Gilia tenuiflora var. triceps Brand, Pflzr. 250: 102, 1907 (*).

Pedicels filiform; calyx 2-4 mm. long; corolla 8-23 mm. long, the tube slender to filiform, throat full, tube and throat together 5-15 mm. long, ratio of tube and throat length to orifice width 1.2-2.5, lobes 2-6 mm. broad, narrower than orifice; stamens slightly exserted from orifice.

Desert mountains and outwash plains, 2800-5200 ft. Esmeralda, Nye and Clark Cos. To E California.

7b. GILIA CANA ssp. SPECIFORMIS A. & V. Grant, El Aliso 3: ~~240~~ 230, 1956.

Pedicels slender; calyx 2.6-4.2 mm. long; corolla 15-29 mm. long, the tube stout, flaring gradually into a slender throat, tube and throat together 10-19 mm. long, ratio of tube and throat length to orifice width 3.0-4.5, lobes 3-8 mm. broad, wider than orifice; stamens maturing at orifice.

Sandy washes, flats and hills, 2800-3800 ft. One record from Nye Co. To E California.

8. GILIA LEPTANTHA Parish, Zoe 5: 74, 1900.

Represented here by 1 subspecies. Other subspecies occur in S. California.

8a. GILIA LEPTANTHA ssp. SALTICOLA (Eastwood) A. & V. Grant, El Aliso 3: 240, 1956.

(*) Lectotype, Purpus 5950, 1898, Gold Mt., Esmeralda Co., in University California herbarium.

Gilia salticola Eastwood, Leafl. West. Bot. 3: 199, 1943; G. alpina Eastwood, not Wedd., loc. cit. 2: 282, 1940.

Small spreading plants with main stems 6-20 cm. long, cobwebby-pubescent at base; basal leaves in a grayish, matted rosette, the rachis narrow, about 1 mm. wide, lobes short; upper leaves reduced to entire bracts; inflorescence diffuse to somewhat congested, the pedicels very unequal, the flowers not showy; calyx glabrous or lightly cobwebby-pubescent; corolla 6-9 mm. long, throat full, tube and throat together 4.5-6.0 mm. long, lobes narrowly oval; corolla tube and throat yellowish, lobes violet; stamens long-exserted; capsule ovoidal, small, 3.3-5.2 mm. long; diploid.

Uncommon on sandy plains and slopes, 4000-6000 ft. Humboldt and Washoe Cos. To NE California.

9. GILIA BRECCIARUM Jones, Contrib. West. Bot. 12: 54, 1908.

Represented here by 1 subspecies. Other subspecies occur in S California.

9a. GILIA BRECCIARUM ssp. BRECCIARUM

Erect or spreading plants with dark green herbage; stems stout, leafy, 1.0-3.5 dm. long, usually quite densely cobwebby-pubescent at base; basal leaves in a rosette, irregularly and coarsely pinnately dissected with a narrow to moderately broad rachis, 1.5-3.0 mm. wide; cauline leaves smaller, pinnately lobed, with a large terminal lobe; inflorescence glomerate, pedicels subequal to unequal, short, flowers medium-sized varying to small; calyx heavily glandular, the trichomes with broad-based multicellular stipe and small black head, the calyx enlarg-

ing to enclose the capsule; corolla broadly funneliform, 7-11 mm. long, 2 to 2-1/2 times as long as the calyx, tube and throat together 5-8 mm. long, lobes 1.8-3.7 mm. long, 1.4-3.0 wide; corolla tube and lower throat dark purple, upper throat bright yellow with violet veins beneath sinuses of lobes, limb violet, or in white-flowered individuals tube reddish, throat pale yellow, lobes white; stamens unequal, the longest exserted, the others maturing at orifice; style short, maturing at orifice; capsule broadly ovoidal, large, 4-7 mm. long; diploid.

Sandy places in the deserts and mountains, 4000-7500 ft. Washoe, Storey, Ormsby, Douglas, Mineral, Esmeralda, Humboldt, Lander, Eureka, Elko and White Pine Cos. Oregon to California (*).

10. GILIA MODOCENSIS Eastw., Leafl. West. Bot. 2: 283, 1940.

Similar to G. brecciarum; herbage bright green; lower stems sparsely cobwebby-pubescent; basal leaf rachis 1-5 mm. wide; cauline leaves more or less clasping, coarsely dentate; inflorescence congested in flower, becoming looser in fruit, pedicels very unequal, flowers small; corolla color as in G. brecciarum except upper throat bright yellow with white veins beneath sinuses of lobes; white-flowered individuals frequent as in G. brecciarum; stamens short, unequal, the longest barely exserted, pollen blue; seeds brown; tetraploid.

Sandy places in the deserts and mountains, 4300-6500 ft. Washoe, Ormsby, Douglas, Lyon, Lander and Nye Cos. Oregon and Idaho to California.

(*) Type, Jones 10009, July 26, 1901, from Contact, Elko Co., in Pomona College herbarium.

11. GILIA SINUATA Dougl. ex Benth., DC. Prodr. 9: 313, 1845.

Stiffly erect plant with stout stems 1-4 dm. long, glabrous and glaucous at base; basal leaves in a rosette, strap-shaped, somewhat succulent, with a broad whitish midvein, rachis 2-6 mm. wide, lateral lobes short; cauline leaves broadly clasping, narrowing to a pointed apex margins toothed or sometimes entire; inflorescence glomerate to diffuse, if congested becoming loose in fruit, pedicels very unequal, flowers small; calyx moderately glandular, the calyx glands usually yellow with short stipe and large head; corolla broadly funnelform, 7-12 mm. long, 2-1/2 to 3-1/2 times as long as calyx, tube well-exserted from calyx, throat short and full, lobes broad, 1.4-4.0 mm. long; corolla tube purple, lower throat yellow, upper throat and orifice pale violet or white, lobes pale violet or pinkish or almost white; stamens short, unequal, maturing at orifice; pollen white; style short, maturing at orifice; capsule ovoidal, 4-7 mm. long; seeds white so far as known; tetraploid.

Sandy desert plains, 4000-6000 ft. Washoe, Douglas, Lyon, Humboldt, Churchill, Esmeralda, Nye and Clark Cos. Washington to California, E to Idaho, Colorado and New Mexico.

12. GILIA INCONSPICUA (Smith) Sweet, Hort. Britt., ed. 1, 286, 1827. Ipomopsis inconspicua Smith, Exotic Bot. 1: 25 & t. 14, 1804; Gilia inconspicua Dougl. ex Hook., Bot. Mag. 56: t. 2883, 1829; G. clokeyi Mason, Madroño 6: 202, 1942 (*).

(*) Type, Clokey 8599, March 31, 1940, Charleston Mts., 1200 m., Clark Co., in University California herbarium.

Small, somewhat spreading plants 1-3 dm. tall, stems leafy below middle, cobwebby-pubescent at base; leaves deeply pinnately lobed into 3-5 or more linear lobes or often somewhat bipinnatifid, with rachis 1.0 - 3.5 mm. wide, lobes 1-3 times as long as rachis width; upper leaves deeply pinnately lobed; inflorescence strict, the pedicels very unequal, the flowers small and inconspicuous; calyx lightly glandular-pubescent; corolla 5.0-11.0 mm. long, lobes 1.6-2.0 mm. long; corolla tube purple or purple-striate, throat pale yellow or suffused with purple from tube and whitish in upper part, lobes violet; stamens unequal, the shortest just at orifice, the longest exserted but exceeded by corolla lobes; style short, maturing at orifice or slightly exserted; capsule large, oblong-ovoidal to subglobular, 3.5-7.7 mm. long; tetraploid.

Sandy plains and washes in the sagebrush, 2000-6500 ft. Washoe, Douglas, Churchill, Elko and Clark Cos. Washington to S California, E to Wyoming and Utah.

13. GILIA INTERIOR A. Grant ex V. Grant, Nat. Hist. Phlox Fa., ~~1957~~ Jan., 1958.

Gilia tenuiflora ssp. interior Mason & A. Grant, Madroño 9: 217, 1948; G. inconspicua ssp. interior A. & V. Grant, El Aliso 3: 253, 1956.

Similar to G. inconspicua; erect plants with delicate slender stems; rachis of basal leaves narrow, 0.5-2.0 mm. wide; corolla tube purple-veined, throat bright yellow with a pair of dark purple spots or markings in upper part below each lobe, lobes pinkish-violet; capsule broadly ovoidal, widening abruptly from base, 4.3-5.0 mm. long; diploid.

Sandy slopes and river benches, 4700-6000 ft. Washoe, Storey, Ormsby and Lyon Cos. To south-central California.

14. GILIA TRANSMONTANA (Mason & A. Grant) A. & V. Grant, El Aliso 3: 266, 1956.

Gilia ochroleuca ssp. transmontana Mason & A. Grant, Madroño 9: 215, 1948.

Erect plants 13-33 cm. tall, with a number of stems arising from base, cobwebby-pubescent below middle; basal leaves not forming a compact rosette; basal and lower cauline leaves pinnately lobed with a narrow rachis, 0.5-1.5 mm. wide; lobes loosely spaced, narrowly linear, 3-9 times as long as rachis width; inflorescence branches strict, pedicels glandular, 1-3 mm. long at maturity of capsule, except the uppermost pedicels longer; calyx moderately glandular, 2.8-3.8 mm. long, the lobes acute to briefly acuminate, terminating 0.5 mm. or less beyond the bordering sinus membrane; corolla small, 4.8-7.0 mm. long, with tube and often part of throat included in calyx; corolla tube purple, lower throat yellow, upper throat white, lobes violet, white-flowered individuals frequent; stamens short, maturing just above orifice; stigmas maturing at stamen level; capsule broadly ovoidal to subglobular, 4.5-6.0 mm. long; tetraploid.

Sandy and gravelly slopes in the desert mountains, 3000-5500 ft. Clark and Nye Cos. S California to NW Arizona.

15. GILIA ALIQUANTA A. & V. Grant, El Aliso 3: 241, 1956.

Represented here by 1 subspecies. Another subspecies occurs in S California.

15a. GILIA ALIQUANTA ssp. BREVILOBA A. & V. Grant, El Aliso 3: 243, 1956.

Small, erect plants 10-25 cm. tall with usually a number of slender stems arising from base, cobwebby-pubescent below middle; basal leaves in a compact rosette, pinnately lobed with a narrow rachis, 0.8-3.0 mm. wide, and linear or roundish lobes 1-3 times as long as the rachis width, sometimes bipinnatifid; leaves above the basal ones much reduced, deeply lobed; inflorescence diffuse, the pedicels slender, divaricate, 2-6 mm. long at maturity of capsule, except the uppermost longer, glandular; calyx not glandular, but glabrous or lightly cobwebby-pubescent, short, 2.2-3.0 mm. long, lobes acute, terminating shortly beyond the bordering sinus membrane, often reddish-tipped; corolla small, 4.5-6.0 mm. long, with tube and often part of throat included in calyx; corolla tube white, throat yellow, white above, lobes pale violet or white; stamens short, slightly exserted from orifice; stigmas maturing at stamen level; capsule globular, 4.0-5.2 mm. long; diploid.

Rocky or gravelly slopes in deserts and desert mountains, 3000-6000 ft. Clark Co. E California to S Utah, W Colorado and NW Arizona.

16. GILIA OPHTHALMOIDES Brand, Pflzr. 250: 108, 1907.

Small, erect plants with slender stems 1-3 dm. long, cobwebby-pubescent at base; basal leaves in a loose to compact rosette, bipinnately

lobed with a narrow rachis 1.0-2.5 mm. wide; upper leaves much reduced, deeply lobed; inflorescence diffuse, the pedicels very unequal, the flowers small and inconspicuous; calyx lobes acuminate, narrowly prolonged (0.5-) 1.0-1.5 mm. beyond the bordering sinus membrane, very sparsely pubescent with small yellow glands or in very young plants cobwebby-pubescent; corolla 6-12 mm. long, tube slender, often well-exserted from calyx, lobes 1-3 mm. long; corolla tube light violet, throat yellow, upper throat and orifice pale blue violet, lobes light pinkish-violet; stamens unequal, the longer slightly exserted, the shortest at orifice; style short, maturing at stamen level; capsule ovoidal with a broad base and narrow apex, or subglobular, 3-7 mm. long; tetraploid.

Sandy places in desert mountains, 3800-8500 ft. Lyon, Mineral, Churchill, Lander, Eureka, Nye, Elko, White Pine, Lincoln and Clark Cos. E California to Wyoming and Colorado (*).

GILIA OCHROLEUCA Jones ssp. OCHROLEUCA was collected at Pyramid Lake, Washoe, Co., by P. B. Kennedy in 1905. This taxon is otherwise known only from the Mojave Desert in California. Its occurrence far to the north in Nevada needs verification.

(*) Type, Purpus 5990, 1898, Gold Mt., Esmeralda Co., in California Academy Sciences herbarium.

SECTION 2. SALTUGILIA : KEY TO SPECIES

Stamens markedly unequal; corolla 8–18 mm. long . . . . 17. G. LEPTALEA

Stamens equal or nearly so; corolla 3–10 mm. long.

Pedicels much longer than the flowers, spreading or reflexed 18. G. TENERRIMA

Pedicels moderately longer to shorter than the flowers, erect.

Corolla openly funnelform; locules of capsule 3–5-seeded; pedicels in part somewhat longer than flowers . . . . . 19. G. CAPILLARIS

Corolla narrowly funnelform; locules of capsule 1–2-seeded; pedicels shorter than flowers . . . . . 20. G. SUBALPINA

17. GILIA LEPTALEA (Gray) Greene, Erythea 4: 58, 1896.

Collomia leptalea Gray, Proc. Amer. Acad. Arts Sci. 8: 261, 1870; Gilia leptalea ssp. euleptalea Brand, Engl. Pflanzenr. IV.250: 97, 1907. Including G. lineata Davids., Bull. S. Calif. Acad. Sci. 22: 71, 1923.

Plant a branching annual 5–25 or even 40 cm. high, the herbage glabrous below; leaves all cauline, linear or narrowly lanceolate, up to 4 cm. long, passing upward into small bracts; inflorescence an open panicle of solitary or paired flowers on moderately long slender pedicels, its herbage somewhat glandular-pubescent; sepals linear, united by narrow membranes over half their length. Corolla 8–18 mm. long, open-funnelform with white or yellow tube, bronzy throat, and pink limb; stamens markedly unequal, the lowest adnate up to base of throat and highest up to blade-sinus; stigmas short, exserted; locules of capsule about 3-seeded.

Gravelly meadow-land, SE Oregon to middle California, and known to have been collected once at the State line N of Lake Tahoe, Washoe Co., Nevada.

18. GILIA TENERRIMA Gray, Proc. Amer. Acad. Arts Sci. 8: 277, 1870.

Navarretia tenerrima Kuntze, Rev. Gen. Pl. 2: 433, 1891.

Plant an erect, often branching annual 15-30 cm. high, the herbage usually finely glandular-pubescent; leaves linear or somewhat oblanceolate, up to 25 mm. long; inflorescence a panicle of mostly solitary flowers on long slender spreading or reflexed pedicels; sepals linear, united by membranes over half their length; corolla open-funnelform, about 3 mm. long, white, pink, or lavender; stamens and short stigmas exserted; locules of capsule 1-2-seeded.

Rocky mountain slopes, E Oregon to Montana and Nevada, where known to have been collected in Elko, Lander, Mineral, Nye and White Pine Cos.

19. GILIA CAPILLARIS Kell., Proc. Calif. Acad. Sci. 5: 46, 1873.

Navarretia capillaris Kuntze, Rev. Gen. Pl. 2: 433, 1891; Gilia leptalea ssp. capillaris Brand, Engl. Pflanzenr. IV.250: 98, 1907. Including G. linearifolia Howell, Fl. NW. Amer.: 461, 1901.

Plant a branching annual 5-20 or even 30 cm. high, the herbage finely glandular-pubescent; leaves mostly linear, but the lower sometimes elliptic and few toothed, up to 3 cm. long; inflorescence a panicle of solitary or paired flowers on moderately long pedicels mostly arising from stems opposite reduced leaves; sepals linear, united by membranes

about half their length; corolla open-funnelform, 5-10 mm. long, white or pinkish, the tube and blades shorter than the throat; stamens equal, adnate up to base of sinuses, the often bright blue anthers exserted; stigmas very short, included; locules of capsule about 3-seeded.

Rocky mountainsides at high altitudes, S Oregon to Idaho and central California. Known to have been collected only in S Washoe Co., Nevada. Specimens which have been distributed to herbaria with a label "Steamboat Springs, Colorado," may well have come from the place of like name (now known as Reno Hot Springs) in this part of Nevada.

20. GILIA SUBALPINA Greene ex Brand, Engl. Pflanzenr. IV.250: 98, 1907.

Plant a reduced derivative of the preceding taxon, - of which it is often regarded as a mere form - differing in the pedicels being shorter than the flowers, the corolla being narrowly funnelform, and the locules of the capsule being only 1-2-seeded.

High mountain meadows, California and adjacent Nevada, where known in S Washoe Co. The type specimen is considered to be a collection by Baker 1358, July 24, 1902, from Little Valley in this county, preserved in the U. S. National Herbarium.

SECTION 3. GILMANIA : KEY TO SPECIES

Leaf-blade broadly elliptic-obovate, incised or subpinnatifid.

Duration seemingly perennial; leaf-teeth long-aristate; corolla 5-7 mm. long; stigmas short . . . . . 21. G. RIPLEYI

Duration seemingly annual; leaf-teeth short-aristate; corolla 6-11 mm. long; stigmas elongate . . . . . 22. G. LATIFOLIA

Leaf-blade elliptic-oblong, 1-3-pinnate.

Leaf-hairs straight; corolla-tube twice as long as throat, exserted.
23. G. SCOPULORUM

Leaf-hairs geniculate; corolla-tube equalling throat, included.
24. G. STELLATA

21. GILIA RIPLEYI Barn., Leafl. W. Bot. 3: 129, 1942.

Including Gilia gilmanii Jeps., Fl. Calif. 3: 192, 1943.

Plant reportedly perennial, up to 15 cm. high, moderately glandular pubescent; leaves up to 4 x 6 cm., shallowly incised, the coarse teeth long-aristate; inflorescence cymose-paniculate, the bracts narrow; sepals linear, united half their length by broad membranes; corolla funnelform, deep pink, opening in the evening; stamens unequal, adnate little above base of corolla-tube, included; stigmas short, level with anthers; locules of capsule many-seeded.

Crevices of limestone cliffs, SE California to S Nevada. The type specimen is a collection by Ripley & Barneby 3992, July 18, 1941, 3100 ft., Specter Range, Nye Co., Nevada, preserved in the Britton Herbarium. Though interpreted as a perennial, the portion of its caudex preserved does not differ in character from that of the next-following, reputedly annual taxon.

22. GILIA LATIFOLIA Wats., Amer. Nat. 9: 347, 1875.

Navarretia latifolia Kuntze, Rev. Gen. Pl. 2: 433, 1891.

Plant reportedly annual, but its caudex and stem markedly woody, glandular-pubescent upward; leaves up to 5 x 12 cm., deeply incised to basally pinnatifid, the broad segments short- or exceptionally long-aristate; inflorescence cymose-paniculate, the bracts leaf-like; sepals

linear-acicular, united around half their length by narrow membranes; corolla funnelform, pink on face of limb but externally bronzy, opening in evening. Stamens unequal, adnate up to middle of corolla-tube, included. Stigmas elongate, lying below the anthers. Locules of capsule many-seeded.

Dry sandy slopes and occasionally rock crevices, S California to SW Utah. In Nevada known to have been collected in Clark, Esmeralda and S Washoe Cos.

23. GILIA SCOPULORUM Jones, Bull. Torr. Bot. Club 8: 70, 1881.

Gilia scopulorum var. typica Brand, Engl. Pflanzenr. IV.250: 109, 1907. Including a var. covillei Brand, loc. cit.

Plant an annual 10-20 or sometimes 30 cm. high, conspicuously pubescent with coarse straight hairs below and glandular above; leaves mostly low on stem though scarcely in a rosette, deeply pinnately cleft into coarse-toothed segments, 2-6 or rarely 9 cm. long passing upward into mostly 3-lobed bracts. Inflorescence a panicle of small cymes or solitary flowers, its herbage somewhat glandular-pubescent. Sepals linear, united over half their length by narrow membranes. Corolla funnelform, the tube twice as long as throat, these yellow but the limb pink, lavender or white; stamens adnate throughout corolla-tube and throat, subequal; stigmas up to 2 mm. long, exserted; locules of capsule many-seeded, the seeds somewhat angled.

Rocky and gravelly slopes in desert lands, S California to Utah and Arizona. Known to have been collected in Clark, Douglas, Mineral and Nye Cos., Nevada.

24. GILIA STELLATA Heller, Muhlenbergia 2: 117, 1906.

Plant with the aspect of the next-preceding taxon, but the copious pubescence of geniculate hairs; leaves 2-3-pinnately dissected, the ultimate segments cuspidate-toothed; inflorescence and calyx as in the preceding taxon; corolla openly funnelform, the tube included, about as long as the throat, the limb lavender to white, often with violet spots at base of petal-blades; stigmas only 1 mm. long.

Sandy flats and desert washes, S California to Utah, Sonora and Baja California. Known to have been collected at a few points in S Clark Co., Nevada.

12. IPOMOPSIS Michx.

(Contributed by Verne Grant and Alva Grant)

Perennial, biennial or annual herbs, often with a basal rosette of leaves and with leafy stems. Herbage frequently villous, sometimes with stipitate glands, or sometimes glabrous. Leaves pinnatifid, the lateral segments well-developed or sometimes reduced, the tips of the segments bearing horny mucros. Inflorescence cymose, varying from loosely racemose to tightly congested, bracteate, each individual flower ordinarily subtended by a bract. Calyx consisting of herbaceous mucronate lobes joined by broad hyaline sinuses, villous, glandular or glabrous. Corolla salverform or tubular, violet, red, white, or varying shades of yellow or pink. Stamens inserted in the tube or in the sinuses of the corolla, often unequal in length and point of insertion, sometimes declined, the anthers exserted or included, pollen blue, white or yellow.

Capsules freely or tardily dehiscent, the locules containing 1 or 2 to several seeds each. Seeds long and slender, often bent, to spheroidal, rounded or angular, white or brown, the surface smooth or corrugated. (Name from Greek for resembling Ipomoea)

KEY TO SPECIES AND SUBSPECIES

1. Plants biennial or perennial; sagebrush plains and mountains.

   2. Flowers large, 2 cm. or more long, in open or congested panicles.

      3. Corolla bright red, with a broad tube.

         4. Stamens markedly unequal in length, shallowly included to long-exserted; corolla 2.5-3.5 cm. long; calyx lobes longer than calyx tube . . . . . 1a. I. AGGREGATA ssp. AGGREGATA

         4. Stamens equal in length, included 3-4 mm. within corolla tube; corolla 2.0-2.5 cm. long; calyx lobes shorter than or subequalling the calyx tube. 1b. I. AGGREGATA ssp. ARIZONICA

      3. Corolla white or pink, with a slender tube 1c. I. AGGREGATA ssp. ATTENUATA

   2. Flowers small, 4-6 mm. long, in capitate heads.

      5. Plants erect or spreading, with stems 10-20 cm. long; sagebrush and coniferous forest . . . . . 2a. I. CONGESTA ssp. CONGESTA

      5. Plants densely matted with stems 4-12 cm. long; subalpine and alpine zones . . . . . 2b. I. CONGESTA ssp. MONTANA

1. Plants annual; deserts.

   6. Leaves pinnatifid; flowers all in terminal clusters 3. I. POLYCLADON

   6. Leaves entire or irregularly toothed; lower flowers solitary in leaf axils . . . . . 4. I. DEPRESSA

1. IPOMOPSIS AGGREGATA (Pursh) Grant, El Aliso 3: 360, 1956.

Cantua aggregata Pursh, Fl. Amer. Sept. 1: 147, 1814; Gilia aggregata Spreng., Syst. Veg., ed. 16, 1: 626, 1825.

Biennial or sometimes perennial herbs with erect stems, simple or

more often branched from the base; leaves pinnatisect with linear acutish lobes; inflorescence a thyrsoid elongate panicle; corolla tubular-funnelform to subsalverform with the tube expanding towards the orifice, lobes rotately spreading or reflexed. Capsule ovoidal, about as long as calyx, with several seeds to a locule.

Open sandy or rocky flats or slopes, mostly in the mountains. Represented here by 3 intergrading subspecies:

1a. IPOMOPSIS AGGREGATA ssp. AGGREGATA.

Height (25-) 45-100 cm.; sparsely pubescent; leaves 3-5 cm. long; inflorescence open (rarely congested); calyx lobes longer than the tube, narrowly acute; corolla odorless, bright red (rarely pink) with pink or white speckling, (2.0-) 2.5-3.5 cm. long, tube broad, lobes lanceolate; stamens well or partly exserted.

In sagebrush or coniferous forest, 5700-8500 ft. Washoe, Storey, Douglas, Ormsby, Lyon, Humboldt, Pershing, Lander, Eureka, Elko, White Pine and Lincoln Cos. Colorado and W Texas to the Pacific Coast.

1b. IPOMOPSIS AGGREGATA ssp. ARIZONICA (Greene) Grant, El Aliso 3: 361, 1956.

Callisteris arizonica Greene, Leafl. 1: 160, 1905; Gilia arizonica Rydb., Bull. Torrey Bot. Club 40: 472, 1913.

Mostly low, (5-) 10-30 cm., occasionally tall, to 60 cm. high; lanate-pubescent; leaves 2-4 cm. long; inflorescence moderately congested; calyx lobes shorter than or subequalling the tube, abruptly acuminate; corolla odorless, bright red, 2.0-2.5 (-3.0) cm. long, tube broad, lobes elliptical; stamens included.

Pinyon-Juniper belt, 6200-9000 ft. White Pine, Lincoln, Eureka and Clark Cos. SE California to S Utah and N Arizona.

1c. IPOMOPSIS AGGREGATA ssp. ATTENUATA (Gray) Grant, El Aliso 3: 360, 1956.

Gilia aggregata var. attenuata Gray, Syn. Fl. 2 (1): 145, 1878.

Height (15-) 25-60 cm.; more or less lanate-pubescent; leaves 3-6 cm. long; inflorescence congested; calyx lobes subequalling or shorter than the tube, narrowly acute with an awn; corolla fragrant, white to pink, 2.5-4.0 cm. long, tube slender, lobes elliptical; stamens included.

In sagebrush or coniferous forest, 5200-9000 ft. Lyon, Humboldt, Churchill, Lander, Nye, Elko, White Pine and Lincoln Cos. Colorado to Washington and California.

2. IPOMOPSIS CONGESTA (Hook.) Grant, El Aliso 3: 361, 1956.

Gilia congesta Hook., Fl. Bor. Amer. 2: 75, 1838.

Erect or matted perennial herbs with several stems and a persistent basal tuft of leaves; arachnoid-floccose; leaves pinnately lobed, 1-4 cm. long, reduced to subpalmate leafy bracts in the inflorescence; inflorescence capitate, the heads single or clustered;corolla white, salverform, small, 4-6 mm. long, with a tube 3-4 mm. long; stamens exserted; capsule obovoidal, with 1 or 2 seeds to a locule.

Dry sandy or rocky slopes and ridges. Represented here by 2 intergrading subspecies:

2a. IPOMOPSIS CONGESTA ssp. CONGESTA

Gilia iberidifolia Benth., Hook. Jour. Bot. 3: 290, 1851; G. neva-

densis Tidestr., Proc. Biol. Soc. Wash. 38: 15, 1925 (*).

Plants erect or spreading with stems 10-20 cm. long; basal leaves pinnately divided.

In the sagebrush, pinyon pine and yellow pine zones, 4000-9000 ft. Washoe, Esmeralda, Humboldt, Lander, Eureka, Nye, Elko, White Pine and Lincoln Cos. South Dakota and Nebraska to Washington, Oregon and E California.

2b. IPOMOPSIS CONGESTA ssp. MONTANA (Nels. & Kennedy) Grant, El Aliso 3: 361, 1956.

Gilia montana Nels. & Kennedy, Proc. Biol. Soc. Wash. 19: 37, 1906; G. congesta var. montana Const.& Roll., Amer. Jour. Bot. 23: 439, 1956.

Plants densely matted or cushion-like with stems 4-12 cm. long; basal leaves palmately divided into short broad lobes.

In high mts. near and above timberline, 7000-12,000 ft. Washoe, Mineral, Esmeralda, Nye, Humboldt and Elko Cos. Oregon to California & Nevada.

3. IPOMOPSIS POLYCLADON (Torr.) Grant, El Aliso 3: 361, 1956.

Gilia polycladon Torr., Bot. Mex. Bound. 146, 1859.

Annual with several naked spreading branches from the base, 5-15 cm. long; puberulent throughout, more or less glandular-villous above; leaves few, 1-2 cm. long, pinnatifid with short mucronulate lobes, crowded about the flower clusters; inflorescence subcapitate; corolla white, salverform, 4-6 mm. long, the lobes ca. 1 mm. long; stamens inserted in the sinuses of corolla; capsule ellipsoidal with 2 seeds to a locule.

(*) Type, A. E. Hitchcock, 865, July 29, 1913, Bunker Hill Mt., Lander Co., in U. S. National Herbarium.

Sandy or gravelly flats or slopes in the desert, 1500-7000 ft. Mineral, Esmeralda, Nye, Clark, Elko, White Pine and Lincoln Cos. Oregon and SE California to Colorado and W Texas.

4. IPOMOPSIS DEPRESSA (Jones) Grant, El Aliso 3: 361, 1956.

Gilia depressa Jones ex Gray, Proc. Amer. Acad. 16: 106, 1880.

Annual, divaricately branched, 2-10 cm. high; glandular-pubescent throughout, or sometimes canescent; leaves well-distributed, linear to elliptic-lanceolate, 1-2 cm. long, short-petioled, the upper ones entire or with 2 teeth; inflorescence a leafy subcapitate raceme; corolla white, salverform, ca. 5 mm. long; capsule subglobose, with 4 or 5 seeds to a locule.

Occasional in dry sandy or gravelly places in the desert, 3500-5000 ft. Washoe, Mineral, Esmeralda, Nye and White Pine Cos. SE California to Utah.

IPOMOPSIS MULTIFLORA was reported from S Nevada by I. Tidestrom. IPOMOPSIS PUMILA was recorded from Washoe Co., by S. Watson. Neither the present author nor Prof. Arthur Holmgren, who has had a wide experience with the Nevada flora, can confirm the occurrence of these species in Nevada.

NAVARRETIA GROUP : KEY TO GENERA

1. Leaf-divisions long and narrow, sharp-pointed but not bristle-tipped.

   2. Pubescence copious, arachnoid to woolly, especially on the inflorescence-herbage, rarely glandular; leaves pinnately dissected or sometimes simple, the tips sharp but exceptionally prickly; sepals

entire; anthers large and sagittate or sporadically small and cordate-ellipsoidal . . . . . 13. ERIASTRUM

2. Pubescence moderate to sparse, often glandular, when woolly only so around inflorescence base; leaves pinnately or bipinnately dissected, rarely simple, the tips often firm and prickly; sepals often pinnately toothed; anthers small, mostly ellipsoidal. 14. NAVARRETIA

1. Leaf-divisions short and broad, many tipped by bristles. 15. LANGLOISIA

13. ERIASTRUM Woot. & Standl.

Plants perennial or mostly annual, the stem often much-branched or in sterile situations simple. Inflorescence capitate-cymose, with an involucre of bracts much like the leaves. Sepals somewhat unequal, subulate, united about half their length by membranes which rupture tardily at maturity. Corolla salverform, actinomorphic to zygomorphic, blue to white. Capsule ellipsoid to prismatic, splitting terminally into 3 valves often tipped by persistent style-segments. Seeds few or rarely one per locule, brown, often viscid when wet. (Name from Greek for wool and star.)

About 15 species, 5 of them known in Nevada.

KEY TO SPECIES

densifolium

1. Duration perennial; segment-tips prickly . . . . . 1. E. ~~DENSIFLORUM~~

1. Duration annual; segment-tips little if at all prickly.

2. Petals 12-20 mm. long, united around half their length to a slightly or markedly zygomorphic corolla; anthers sagittate, in part exserted . . . . . 2. E. EREMICUM

2. Petals 6-14 mm. long, united well over half their length to a nearly or quite actinomorphic corolla.

3. Stem ascending-branched, pubescent; stamens included or barely exserted, the anthers sagittate.

4. Branching sub-corymbose; corolla 9-14 mm. long, blue with conspicuous yellow throat . . . . . 3. E. WILCOXII

4. Branching paniculate; corolla 6-8 mm. long, bluish or white with inconspicuous throat. . . . . 4. E. SPARSIFLORUM

3. Stem spreading-branched, glabrous; corolla 6-8 mm. long, blue; stamens exserted, the anthers small, cordate. . . 5. E. DIFFUSUM

1. ERIASTRUM DENSIFOLIUM (Benth.) Mason, Madroño 8: 73, 1945.

Huegelia densifolia Benth., Edw. Bot. Reg. 19: pl. 1622 text, 1833; Gilia huegelia Steud., Nom., ed. 2, 1: 683, 1840; G. densifolia Benth., DC. Prodr. 9: 311, 1845; Navarretia densifolia Kuntze, Rev. Gen. Pl. 2: 433, 1891; Welwitschia densifolia Tidestr., Contr. U. S. Nat. Herb. 25: 429, 1925.

Plant a low shrub or woody-based perennial, with multiple simple or upwardly branched stems, sparsely to copiously woolly; leaves irregularly pinnatifid into rigid teeth; corolla blue, 8-10 mm. long.

Open thickets on rocky or sandy slopes, S California and Baja California. Several herbaria contain fragments labelled merely "Nevada," presumably from the SW border of the State.

2. ERIASTRUM EREMICUM (Jeps.) Mason, Madroño 8: 78, 1945.

Huegelia eremica Jeps., Man. Fl. Pl. Calif.: 793, 1925; Gilia eremica Craig, Bull. Torr. Bot. Club 61: 416, 1934.

Plant a branching annual, the herbage sparsely arachnoid or rarely densely tomentose; leaves mostly pinnatifid; petals 12-20 mm. long, united around half their length, the limb slightly or often strongly zygomorphic, bright blue or exceptionally lilac or white; anthers sagittate, some or all exserted.

Dry sandy land, SE California to Utah and Arizona. Known to have been collected in Churchill, Clark, Esmeralda, Humboldt, Lander, Lincoln, Lyon, Nye, Ormsby and Washoe Cos., Nevada.

3. ERIASTRUM WILCOXII (Nels.) Mason, Madroño 8: 85, 1945.

Gilia wilcoxii Nels., Bot. Gaz. 34: 27, 1902; Navarretia wilcoxii Brand, Engl. Pflanzenr. IV.250: 165, 1907; Welwitschia wilcoxii Rydb., Fl. Rocky Mts.: 688, 1917.

Plant an erect annual with elongate branches producing a flattish summit; herbage sparsely to densely tomentose; leaves dissected into 5 lobes, or the upper 3-lobed to simple; corolla actinomorphic, blue to white, exceedingly variable, the petals ranging from 9-14 mm. long and united from 5/8 to 7/8 their length, with a throat around 2 mm. long, yellow to white; anthers inconspicuously sagittate.

Dry situations of many sorts, Washington to Idaho, Utah and SE California. Common nearly throughout Nevada, where known to have been collected in every county, although rare southward.

This taxon is here interpreted as by Mason, loc. cit., but on further study seems likely to prove divisible into multiple subspecies.

4. ERIASTRUM SPARSIFLORUM (Eastw.) Mason, Madroño 8: 86, 1945.

Gilia sparsiflora Eastw., Proc. Calif. Acad. Sci. (3) 2: 291, 1902; Navarretia filifolia ssp. sparsiflora Brand, Engl. Pflanzenr. IV.250: 167, 1907; Gilia filifolia var. sparsiflora Macbr., Contr. Gray Herb. 49: 57, 1917; Huegelia filifolia var. sparsiflora Jeps., Man. Fl. Pl. Calif.: 742, 1925.

Plant an erect annual with short ascending branches, attaining con-

spicuously different levels; herbage glabrescent or sparsely arachnoid; leaves dissected into few lobes, or many simple; corolla 6-8 mm. long, pale blue or often white, the petals 6-8 mm. long, united around 3/4 their length, the throat inconspicuous, about 1 mm. long; anthers small, sub-sagittate.

Dry gravelly slopes, Oregon to W Nevada and SE California. Known to have been collected in Douglas, Mineral, Nye, Ormsby and Washoe Cos., Nevada.

5. ERIASTRUM DIFFUSUM (Gray) Mason, Madroño 8: 76, 1945.

Gilia filifolia var. diffusa Gray, Proc. Amer. Acad. Arts Sci. 8: 272, 1870; Navarretia filifolia var. diffusa Brand, Engl. Pflanzenr. IV.250: 167, 1907; Welwitschia diffusa Rydb., Fl. Rocky Mts.: 688, 1917; W. filifolia diffusa Tidestr., Proc. Biol. Soc. Wash. 48: 42, 1935; Huegelia diffusa Jeps., Fl. Calif. 3: 167, 1943.

Plant a nearly glabrous annual with wide-spreading branches, often broader than high; leaves few-lobed to simple; corolla actinomorphic, 6-8 mm. long, blue; stamens exserted, the anthers relatively small and cordate-ellipsoidal.

Sandy flats, S California to W Texas and No Mexico. Rare in Nevada, and known to have been collected only once in each of Clark and Nye Cos.

14. NAVARRETIA Ruiz & Pavon

Plants small to moderate-sized annuals, simple or branched. Leaves mostly firm and prickly, pinnately or bipinnately dissected, or rarely simple. Inflorescence capitate-cymose, with a conspicuous involucre. Sepals unequal, subulate, often pinnately toothed, united by a membrane

which ruptures tardily at maturity. Corolla funnelform-salverform, lavender, white, or yellow. Capsule dehiscing terminally or sometimes breaking up irregularly or even indehiscent. Seeds angular, few or sometimes one per locule. (Name in honor of F. Navarrette).

About 30 species, chiefly in western North America, but a few in South America. Only 3 have been recorded from Nevada.

KEY TO SPECIES

Herbage minutely glandular; flower-parts respectively 5, 5, 5, and 3; corolla yellow; capsule dehiscent . . . . . 1. N. BREWERI

Herbage eglandular-pubescent; flower-parts 5, 5, 5, and 3 to 4, 4, 4, and 2; corolla white; capsule indehiscent.

Bracts firm and acerose; leaves all pinnately dissected; calyx and corolla about 8 mm. long . . . . . 2. N. PROPINQUA

Bracts subherbaceous; leaves in part reduced to solitary filiform blades; calyx and corolla about 5 mm. long . . . . . 3. N. MINIMA

1. NAVARRETIA BREWERI (Gray) Greene, Pittonia 1: 137, 1887.

Gilia breweri Gray, Proc. Amer. Acad. Arts Sci. 8: 269, 1870.

Height 7-15 cm.; herbage glabrescent, but the stem bearing minute glands; leaves pinnatisect, subherbaceous; inflorescence somewhat lax, 5-10-flowered; sepals 5, united about 1/3 their length; corolla 6-8 mm. long, the 5 petal-blades bright to pale yellow; capsule dehiscing normally; few seeds dark brown, viscid when wet.

Dry thickets and barrens, Washington to Wyoming, Colorado and California. Known to have been collected in Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Nye, Pershing, Washoe and White Pine Cos., Nevada.

2. NAVARRETIA PROPINQUA Suksd., Allg. Bot. Zeit. 12: 26, 1906.

Navarretia intertexta var. propinqua Brand, Engl. Pflanzenr. IV.250: 163, 1907.

Height 3-10 cm., the branches often spreading so that the clump is broader than high; herbage eglandular-pubescent; leaves 1-2-pinnatisect, the remote lobes acerose; stalk of bracts with a firm expanded base; sepals unequal, the longer ones few-toothed toward tip; corolla slightly shorter than the calyx, white to pale lavender; anthers and 2 short stigmas exserted; capsule indehiscent, its septae obsolete; seeds several, dark brown, pitted, little affected by moisture.

Sandy slopes and meadows, Washington to North Dakota, New Mexico and easternmost California. Known to have been collected in Douglas, Elko, Humboldt and Washoe Cos.

3. NAVARRETIA MINIMA Nutt., J. Acad. Nat. Sci. Phila. (2) 1: 160, 1848.

Gilia minima Gray, Proc. Amer. Acad. Arts Sci. 8: 269, 1870.

Height 3-10 cm., the branches often spreading so that the clump is as wide as high; herbage glabrescent or moderately eglandular-pubescent upward; leaves pinnatisect or often reduced to solitary lobes, prickly; inflorescence compact, of rather few flowers, the parts of which usually number respectively 4, 4, 4, and 2; sepals united over half their length; corolla 4-6 mm. long, the petal-blades white; capsule indehiscent, its septae obsolete; seeds few, pale brown, scarcely affected by moisture.

Sterile clayey flats, often moist in spring but baking hard in summer, Washington to South Dakota, Colorado and California. Rare in N

Nevada, where known to have been collected only in Elko and Washoe Cos.

15. LANGLOISIA Greene

Plants low compact spreading-branched annuals. Leaves linear to obovate, shallowly pinnatifid with some or all the segments tipped by long rigid bristles. Inflorescence capitate-cymose, with an involucre of bristly leaf-like bracts. Sepals equal, acerose, united by a membrane which early ruptures. Corolla funnelform-salverform, showy, ranging from nearly actinomorphic to markedly zygomorphic. Capsule prismatic, its locules containing 1-3 seeds, these brown and becoming ~~viscid~~ viscid when wet. (Name in honor of Rev. A. B. Langlois).

Four species, all known in Nevada.

KEY TO SPECIES

Corolla nearly actinomorphic; stamens moderately exserted.

Petals united about half their length . . . . . 1. L. PUNCTATA

Petals united about 2/3 their length . . . . . 2. L. SETOSISSIMA

Corolla strongly zygomorphic.

Corolla-tube much exceeding calyx; stamens and styles long-exserted, declined . . . . . 3. L. MATTHEWSII

Corolla-tube about equal to calyx; stamens and styles little-exserted, nearly straight . . . . . 4. L. SCHOTTII

1. LANGLOISIA PUNCTATA (Gray ex Cov.) Goodd., Bot. Gaz. 37: 58, 1904.

Gilia setosissima var. punctata Gray ex Cov., Proc. Biol. Soc. Wash. 7: 72, 1892; Navarretia setosissima punctata Cov., Contr. U. S. Nat. Herb. 4: 154, 1893; Gilia punctata Munz, Man. S. Calif. Bot.: 402, 1935. Including Langloisia lanata Brand, Engl. Pflanzenr. IV.250, : 169, 1907.

Stem simple or often branching into a broad clump, 4-8 (sometimes 15) cm. high, sparse-woolly to glabrescent; lower leaves linear and upper obovate and terminally 3-lobed, the segments all tipped with simple or branched bristles; sepals about 8 mm. long; petals 15-20 mm. long, united about half their length, obtuse, lilac with purple spots and a pubescent yellow ridge near blade-base; anthers blue.

Dry gravelly slopes, S California to Arizona. Known to have been collected in Clark, Esmeralda, Mineral and Nye Cos., Nevada.

The taxon named by Brand Langloisia lanata was an especially pubescent extreme not regarded as worthy of nomenclatorial recognition. Its type was a collection by M. E. Jones 3965, June 22, 1882, from Candelaria, Mineral Co., Nevada. The type in the Berlin-Dahlem Herbarium has presumably been destroyed, in which case the sheet bearing the same collection data in the U. S. National Herbarium may serve as neotype.

2. LANGLOISIA SETOSISSIMA (Torr. & Gray) Greene, Pittonia 3: 30, 1896. Navarretia setosissima Torr. & Gray ex Torr., Rep. Colo. R., Ives, Bot.: 22, 1860; Gilia setosissima Gray, Proc. Amer. Acad. Arts Sci. 8: 271, 1870; Loeselia setosissima Peter, Engl. & Prantl Nat. Pflanzenf. 4.3a: 54, 1891.

Stem simple, 3-7 cm. high, sometimes with elongate prostrate branches; leaves narrower than in the next-preceding taxon; sepals 6 mm. long; petals 12-15 mm. long, united about 2/3 their length, obtusish, uniformly lavender; anthers light blue.

Gravelly washes, Oregon to Idaho, No Mexico and California. The commonest member of the genus in Nevada, numerous specimens having been

collected in Clark, and a few in Esmeralda, Lincoln, Mineral and Nye Cos.

3. LANGLOISIA MATTHEWSII (Gray) Greene, Pittonia 3: 30, 1896.

Loeselia matthewsii Gray, Bot. Calif. 2: 466, 1880; Gilia matthewsii Gray, Syn. Fl. N. Amer., ed. 2, 2.1: 409, 1886; Navarretia matthewsii Kuntze, Rev. Gen. Fl. 2: 433, 1891.

Stem basally or upwardly branched to form a mat up to 30 cm. broad, sparse-pubescent; leaves broadly linear, little expanded terminally, shallowly cut into numerous bristle-tipped teeth; sepals 5-6 mm. long; petals 15-20 mm. long, united half their length to a markedly zygomorphic corolla, obtusish and erosely toothed, lilac with purple reticulate lines on upper lip; stamens and style long-exserted and markedly declined.

Sandy flats, California to Arizona and No Mexico. Known to have been collected in Clark and Mineral Cos., Nevada.

4. LANGLOISIA SCHOTTII (Torr.) Greene, Pittonia 3: 30, 1896.

Navarretia schottii Torr., Mex. Bound. Surv., Bot.: 145, 1859; Gilia setosissima var. exigua Gray, Proc. Amer. Acad. Arts Sci. 8: 271, 1870; G. schottii Wats., Bot. King Expl. Exp.: 267, 1871; Loeselia schottii Gray, Bot. Calif. 2: 466, 1880.

Stem erect, 3-10 cm. high, with few elongate basal branches and multiple short upper ones, villous-pubescent; leaves linear or somewhat expanded terminally, with multiple bristle-tipped teeth; sepals about 4 mm. long; petals 8-14 mm. long, united over half their length to a zygomorphic corolla, acutish, lilac or sometimes yellowish white, spotted or mottled with purple; stamens and style only slightly exserted and declined.

Sandy washes, California to Utah and No Mexico. Known to have been collected in Clark, Esmeralda and S Lincoln Cos., Nevada.

In addition to the taxa above treated, there are several others which occur in states adjoining Nevada near enough to make their future discovery in this State seem likely.

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